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CACTUS AND Ssucculent JOURNAL

Of the Cactus And Succulent Society Of America

Vol. XXVIII MARCH-APRIL, 1956 No. 2

FIG. 16. From increasing numbers of signs come ominous warning to the traveler about the fate of the desert. (See pg. 39)

CACTUS AND SUCCULENT JOURNAL

Published and owned by the Cactus and Succulent Society of America, Inc., 132 W. Union St., Pasadena, Calif. A magazine to promote the Society and devoted to Cacti and Succulents for the dissemination of knowledge and the recording of hitherto unpublished data in order that the culture and study of these particular plants may attain the popularity which is justly theirs. North and South America $3.00 per year; foreign $3.50 by money order. Mail application to SCOTT HASELTON, Editor, 132 West Union Street, Pasadena 1, California. *Editorial Staff:* THE ENTIRE SOCIETY. Entered as second Class Matter at Pasadena, Calif., under act of March 3, 1879. Published bi-monthly. We reserve the right to accept or reject advertising or articles sent to this JOURNAL.

Vol. XXVIII MARCH-APRIL, 1956 (Price 50¢) No. 2

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THE PRESIDENT'S MESSAGE

It is a pleasure to welcome to the Cactus and Succulent Society of America a new affiliate, the New Mexico Cactus and Succulent Society. The affiliation of this society received the official action of the Executive Board at its meeting on January 20th. This new and active organization is a welcome addition to our group.

At the January Executive Board meeting the following appointments were made:

Mrs. Orva Bokarica, Librarian;

Mrs. Gene Luckenbacker, Corresponding Secretary and Publicity Director.

We are happy to welcome them to the Executive Board, and we appreciate their help in these posts.

Members of the Cactus and Succulent Society and their friends are invited to attend the David French lecture to be given this year by Dr. Alfred S. Romer, Director of the Museum of Comparative Zoology of Harvard University, on Tuesday evening, March 20, at 8:15 p.m., Holmes Hall at Pomona College (College Avenue between 5th and 6th Streets). Dr. Romer's subject will be "Texas Red Bed Fossils and Vertebrate Evolution."

LYMAN BENSON

LOCAL MEETINGS

The Cactus and Succulent Society of America has several open meetings and trips planned for this year. The first will be an illustrated lecture, "California Cacti", at the Exposition Park Museum on April 8 at 2 p.m. On May 5 and 6 there will be a Field Trip to the Joshua Tree National Monument at Twenty-nine Palms. Camping facilities will be available or one may stay in Motels. Society President, Dr. Lyman Benson will be the speaker. Local members will receive special notices for each event. Save the above dates and get acquainted with other members of the Society.

DON B. SKINNER
8627 Denver, Los Angeles

OPEN LETTER TO AFFILIATES

At their last meeting the Executive Board transferred the Slide Loan Library to the Committee in Charge of Slides. A new set on Arizona Cacti is now available. Future requests and deposit of $5.00 for each set of slides should be mailed to:

George G. Glade
7600 Verdugo Crestline Dr.
Tujunga, California

All other Affiliate correspondence should be sent to your new Corresponding Secretary:

Mrs. Gene Luckenbacker
4400 Portola Avenue
Los Angeles 32, California

It is our sincere wish that all Affiliates will make use of the Slide Lending Library and that they do not hesitate to write us if they feel we can be of help in any way.

MARY GLADE, *Secretary*

COFFEE AND TWO DOUGHNUTS FOR A NICKEL

Haircuts were 25 cents and even Ford Motors had a goal of a touring car, a farm truck and a tractor all for $1000—but that was a long time ago. Now you pay 25 cents for a cup of coffee and two doughnuts or five times as much as it cost when the *Cactus Journal* started Vol. I, No. 1, twenty-seven years ago. On that basis, to say nothing about labor and comparative items, the Journal should cost you $15.00 a year! We are not going to such extremes but on June 1, 1956 the Journal will be $4.00 a year instead of the $3.00 price at which it started so long ago. Many of our Members voluntarily paid the new rate when they renewed for 1956 and our advance in price is based on their approval.

SCOTT E. HASELTON, *Editor*

MINNESOTA MEMBERS

Members living in the vicinity of Minneapolis and St. Paul should contact Mrs. W. H. Lysen, 3954 Elliot Ave. So., Minneapolis, Minnesota, regarding forming a Cactus Club.

FIG. 17. The restraints of "Danger—Peligro" are found in many desert areas, testifying to past and present uses of this region for military purposes.

Our Deserts Are Not Expendable

By HARRY C. JAMES
President, Desert Protective Council

Reprinted through the courtesy of Harry C. James and the American Nature Association from the November, 1955, issue of Nature Magazine

"Peligro—Danger—Keep Out—Unexploded Shells—Unexploded Mines—Do Not Disturb Unfamiliar Objects—Closed to Public Entry."

From ever-increasing numbers of signs these ominous warnings give pause to the traveler on the highways of our southwestern deserts. They demonstrate all too well the fact that thousands of acres of desert land in every State of the Southwest have been preempted by the armed services and are now closed to the people whose heritage they are. Moreover, many of these areas will remain closed for the foreseeable future by reason of hazardous contamination.

To those of us who know something of the desert, and who have deep-seated affection for its great open sweeps, the past decade has brought dismay and apprehension. We have looked on, too unprotesting, while many of these eye-stretching vistas have fallen prey to exploiter and developer.

Sub-divisions have sprung up here, there and everywhere; desert roads have been elaborated into highways; towns have evolved from jack-rabbit homesites—those five-acre plots surveyed out by the Federal government as a series of poor man's Palm Springs; distant springs have been developed and their waters piped afar, while wells have been sunk deeper and deeper into the constantly lowering water table. Often there is quite a race among salesmen to sell the last lot before the water table is pumped dry! This might be amusing if it were not so tragic —not only for the people who are buying the lots and building their homes, but also for the wildlife, whose scant water supply is thus appropriated. When the wells and the springs go dry the luckless purchaser can haul water or give up and move away, but long before that the birds and mammals dependent upon the original supply likely will have disappeared.

California's unique and beautiful native palms also are suffering from man's thoughtless, if not ruthless, encroachment. Scarcely a grove is left unmarred; their trunks blackened and initialed; their graceful skirts of dead fronds burned—victims of the fool who must see his name in a public place, and of the hedonist gratified by the sight of seeing a century of growth go up in flames.

The balance of Nature in the desert is a balance of great delicacy. Although desert plants and animals have developed adaptations to their environment that are a never-ending source of amazement, the fact remains that they do re-

quire certain minimal conditions if they are to survive. Water, food, refuge from enemies, shelter from winds and sun—these they must have, even as all of us, or they cease to exist.

The little night lizard is an excellent example of the threat to desert wildlife. It has a restricted habitat, living under rotted branches and trunks of prostrate dead Joshua trees. Thousands of these grotesque trees are now being uprooted and destroyed to clear lands for agricultural development, or for sub-dividing. Within the last few years great areas have been denuded of this largest of the lilies for the purpose of manufacturing from it a new type of wallboard. The desert night lizard, or yucca night lizard, as it is sometimes called, may well be in jeopardy if the destruction of the Joshua tree forests continues unabated.

Even the rocky territory of the chunky chuckawalla is being more and more restricted by man's invasion of the desert. The chuckawalla is not prolific, and it requires an environment where there are cracks and crevices into which it can retreat and puff itself up into safety from the many predators—not least of them, man—that hunt him constantly.

Of the many forces that are endangering desert wildlife at the present time none is having a more devastating effect than the armed forces' reckless use of the desert lands under their control. Demand for additional land in every southwestern State is being made almost daily by Army, Navy, and Air Force, for the extension of present holdings, or for the establishment of new installations. Wildlife refuges seem specially marked for invasion.

Anza Desert State Park in California has lost a major portion of its original area, and the Navy continues to urge enlargement of its bombing range there. The Navy also has started proceedings to acquire about 900,000 acres of California's Saline Valley, one of the most spectacularly beautiful of the great desert valleys of the West, but, temporarily at least, has cancelled its request.

Almost all land north of U. S. Highway 95, from Las Vegas to Goldfield, Nevada, is now under the authority of the armed services and the Atomic Energy Commission. As a consequence, safeguarding and efficient management of bighorn sheep, antelope, deer, quail, and other forms of wildlife in that area are either decidedly restricted or definitely nonexistent. In some areas it approaches a situation that grants exclusive hunting rights to members of the armed forces!

In one section of a bighorn sheep refuge near Las Vegas the carcasses of eighteen desert bighorn were found. They had been shot and left to rot; this when that part of the refuge was within the Las Vegas Gunnery Range.

FIG. 18. Tangles of barbed wire still line the sides of many washes.

A resident of Antelope Valley, California, has written of his concern over the desert tortoise. He has picked up more than a thousand shells along highways and elsewhere, the animals that once inhabited them having been destroyed by both civilians and air force men. He reports finding a number of tortoises tied to clotheslines, their shells ragged from protracted attempts to free themselves. So great is this man's distress over this unnecessary waste of wildlife that he is planning to buy ten acres on which to set up a sort of desert tortoise preserve!

Reports from quite another source—an air base in another part of the southern California desert—describe Air Force drivers of trucks and passenger cars going out of their way to drive over similar tortoises for the sadistic thrill of hearing them "pop." From a rancher in Oregon comes information of the practical extermination of a herd of antelope by aircraft strafing during the war years. Approval of such practices is inexcusable.

Stories of this kind are legion—many of them, of course, impossible to confirm. However, their very prevalence would indicate serious fire beneath the smoke of rumor.

Most persistent of the unverifiable stories is to the effect that, during his desert maneuvers,

one general had his men scatter hundreds of pounds of poison grain around various installations in the training area, presumably to kill ground squirrels and other rodents that might be carrying disease-spreading parasites. The death toll of quail and other desert birds is said to have been appalling.

Recent personal exploration of this desert area between Desert Center and the Colorado River, where troops were trained for the North Africa campaign, gives credence to the tales of wildlife destruction indeed, obliteration—by even the preparatory stratagems for a specialized type of warfare.

FIG. 19. Scarcely a grove is left unmarred, trunks of trees blackened and initialed.

Wild "roads" radiate out in all directions over the arid stretches, beaten down to pavement hardness by tanks and trucks. Rough, rocky expanses had been leveled to the smoothness of city streets, as glassy in spots as the glacial polish on the high domes of Yosemite. Tangles of barbed wire still line the side of the washes. Tank treads have jammed cartridge cases among the great rock piles. A discarded gas mask bares its skull-like outline at the foot of a smoke tree.

It was April, but we saw not a single lizard; we heard not even one desert bird; we retraced no track of lizard, snake, or rodent. Life seemed to be taking an enforced holiday.

We recalled stories of how water-holes had been put out of use during this training era. The troops, as part of their conditioning for desert warfare, were required to subsist on very little water. To put in force this phase of training, a large number of water-holes were blasted out of use, and wells, springs, and seeps were cemented up. It is all too obvious what effect such action would have—or did have—on wildlife.

One must add a somewhat happier footnote to this. After the war the California Department of Fish and Game, and a few interested individuals, worked diligently to open up many of the seeps and to clean out wells and "tanks" that had been thus destroyed.

The desert-trained troops seem to have done a good job of cleaning up after themselves, so far as movable equipment and general litter are concerned. One drives along the highway in that area and sees little to remind him of the thousands of men that were stationed there. Occasionally rows of neatly piled rocks are all that remain of a troop hospital or a headquarters camp. The army wiped the area clean of beer cans and other debris—but also of every vestige of wildlife!

One enheartening experience marked our days in that grim area. Wandering through the soundless wastes we came upon a *playa*, a sandy stretch several miles in extent, dotted with thousands of Mojave lilies in full bloom! It was Easter week, and this was resurrection indeed. Even the warlike tread of tank and truck had not been able to destroy the deeply rooted bulbs.

Dr. Edmund C. Jaeger, author of many books on the deserts of the Southwest, writes in confirmation of what happens to wildlife when the Army or Navy takes over an area. In a recent letter he says this in part: "Animal life, never plentiful in that (Patton) maneuver area, is now almost non-existent. It may be due to drought in part but not wholly by any means. . . . One soldier told of how the men used to go out when they had free time, with revolvers and see how many chuckawallas they could kill. Smaller lizards were killed too 'just for fun and to have something to do.' . . . A man in Redlands told me that the last small band of antelope disappeared from Milpitas Wash when the Navy took over the ground east of the Chocolate Mts."

One is happy to be able to commend some commanding officers for wholehearted cooperation with conservationist attempts to safeguard desert wildlife and its environment. Guy Fleming, former regional director of California state parks, always speaks with high praise of how General Joseph Stilwell worked with him in the days when Stilwell was conducting maneuvers

back of San Diego. Officers of the Nellis Air Force Base in Nevada have been equally cooperative with conservation authorities in their area. In 1953, when a Marine Corps Artillery Training Base was established near Twentynine Palms, California, General Pepper requested an investigation of the area by the California Department of Fish and Game and Wildlife Service to the end of formulating a plan for the protection of any bighorn sheep that might still be ranging the Bullion Mountains.

But on the whole we have been unable to find evidence that any real attempt was made to educate officers in charge of extensive desert maneuvers as to the desirability of conserving wildlife in the territory under their jurisdiction. Both Army generals and GI Joe seem to share the far too common attitude that all desert lands are expendable and that all desert wildlife is poisonous, and, therefore, worthless.

Suggestions that the armed forces consult and cooperate with authorities on desert wildlife and desert lands in working out a program for their protection far too often are brushed aside. Protests against misuse have been either treated with scant courtesy or completely ignored. As a result the rape of the southwestern deserts continues at an ever-accelerated pace.

To remedy all this a long-range study, an over-all policy, and a well-considered program are necessary. These must be worked out and approved by top echelon officers in Washington in collaboration with accepted authorities on the conservation of the desert. The program must be enforced with vigor upon every branch of the armed services in every installation in the Southwest, whether it be permanent or temporary.

Such a study should include, too, consideration of just how truly necessary is the demand for more and more territory. Many persons familiar with the desert certainly feel that there is dismaying duplication in the use—or misuse—of land now under armed services control. Much land now closed to public use could be relinquished if some sort of agreement could be worked out for unilateral use of artillery and other ranges by the various divisions of the armed services.

The proper training of armed services personnel and the proper testing of the instruments of war are, without question, essential. But why the desert lands? Might it not be possible to use California's offshore islands, which for many years have been under armed services control? There the sky would be limit as far as firing ranges are concerned. If these islands are inadequate, what about arificial islands? Their construction might solve the problem of what to do with the vessels now in our mothball fleet.

Not long ago I ventured into a desert wash located near, but not in, a signed abandoned army training camp. My objective was a particularly interesting smoke tree that I wished to photograph. I had some difficulty getting the tripod evenly and firmly set up. The day was hot, and I got a bit harassed and cranky as the jointed legs became more and more unmanageable. I kicked a few loose rocks out of the way, and there, directly under my tripod, was the ugly, egg-shaped nose of a mammoth unexploded shell. Despite the heat I felt a cold chill go down my spine. Needless to add, the smoke tree remained unshot.

Surely the high brass of the Pentagon can come to see the wisdom of joining in the effort to determine that the very qualities that now lure us to the desert shall not vanish from the

FIG. 20. A discarded gas mask bares its skull-like outline at the foot of a smoke tree, a symbol of the desert's fate.

southwestern scene. Photographer, rock hound, botanist, biologist, hiker, just plain meditator—humans all—should, with lesser wildlife, feel free from the restraints of "Danger—Peligro" in most of our southwestern deserts.

The deserts, like the high alpine meadows of our western mountains, heal very slowly from man-made wounds. Yet their power to bring solace to the heart of man is great. That so many thousands of American go to them to find the stimulus to contemplation that is afforded by their solitudes, by their wide horizons, and by their ingenious and courageous animals and plants, is proof sufficient that they are not expendable wastelands which we can afford to ruthlessly destroy.

"To those who come to the desert with friendliness, it gives friendship; to those who come with courage it gives new strength of character. Those seeking relaxation find release from the world of man-made troubles; for those seeking beauty, the desert offers Nature's rarest artistry. This is the desert that men and women learn to love."

—DESERT MAGAZINE

EDITOR'S NOTE:

The Desert Protective Council is a non-profit organization which is working tirelessly on the assumption that "Our Deserts Are Not Expendable." Every member of our Society can help in this work by becoming a member. Are your deserts worth one dollar a year to you? Show the Desert Protective Council that we are willing to support their work. Adult dues are $1 a year, Juniors 50¢. Their mail address is Box 308, Palm Desert, Calif.

SPOTLIGHT ON ROUND ROBINS

A new International Robin, No. 2, subject, Cacti and Succulents, started its flight at the beginning of this year. Its circuit is to New Zealand, Australia, England, and back to the U. S. A. Its membership includes Miss Anne Compton-Smith, Khandallah, Wellington, New Zealand; Mrs. H. L. Curnow, Parkholme So. Australia, Australia; Mrs. Norma Greenhill, Bridgeport, Connecticut; Mr. Lawrence C. Gallant, Pittsburgh, Pennsylvania; Mrs. Alice Evans, Old Clee, Grimsby, Lincolnshire, England. Happy flying to this Robin. There is space for another member if anyone is interested.

From C. & S. R. Robin, No. 3, Director Mr. John A. Bock, Sharon, Pennsylvania, I should like to share a recent round, much abbreviated, of course. Not all of us can travel as much or as far as we should like to, but the next best is to hear about the trips of other members and see a few of the pictures brought back. All in this one round John Bock gave a detailed account of his trip to Southwestern U. S. and included nine pictures; Bill Weber, of Middlefield, Ohio, supplied an account of his trip to Florida; and Midge Wihtol, of Middletown, New Jersey, gave an outline of her trip to some of the Mediterranean countries she visited and included three pictures. She said she took along her "fish can of pumice" for the cuttings she hoped to find to bring home (and did). Since the use of pumice for a rooting medium was new to me I thought you might like to hear what she had to say about it. She said, "I prefer pumice to any other rooting medium because it is so clean and light. It is sterile and shiny white and may be used over and over. It is so unresistant that you can pull a rooted cutting right out by the top and much more of the material adheres to the roots." She went on to say it is called #3 Bolted Italian Pumice and that the firm handling this product was surprised at the use she made of it.

This Robin, in addition to these tales of travel, had several more pictures from other members making a very fine collection of letters. This Robin has seen many changes in membership but still retains two of its original group, Mrs. Evelyn Camelbeek, Hudson, New York, and John Bock, and is a very lively Robin. It makes its rounds quite regularly. It welcomed a new member, Mrs. James J. Hearne, Jr., of Tampa, Florida, a short time ago.

C. & S. R. Robin, No. 8, under the direction of Miss Marian Fox, Watertown, New York, is a fledgling among our Robins but there is nothing uncertain about it as it was off to a fine start a few months ago with these members: Mrs. Winthrop C. Swain, Hingham, Massachcusetts; Mrs. Fred Guertin, Harrisville, Rhode Island; Mr. Lawrence C. Gallant, Pittsburgh, Pennsylvania; Mrs. Norma Greenhill, Bridgeport, Connecticut; Miss Maude C. Gogswell, Hamburg, New York.

From this Robin came a Christmas tree suggestion which might be jotted down for next year if a big Crassula is on hand. Mrs. Swain said, "My big Crassula argentea was my Christmas tree last year. It was out in the sun all summer and in the laundry (west window) in October when cool weather came. Gave it a bit of plant food and kept it rather dry until flowers came out all over it in November. Brought it into the living room west window before Christmas, decorated it with cool electric lights, barley sugar animals, candy canes, plastic icicles, also home made and decorated Christmas cookies. . . . The neighbor children were impressed."

Larry Gallant added this, "Someone once said that people who helped grow things are happier and have a better outlook on life than others, and I think that must go double for people who raise cacti and succulents because most people just can't see anything in them at all." Larry is one of our youngest members and seems to be the philosopher of Robin, No. 8.

The invitation still stands; if you would like to join a Robin just drop me a line. Happy flying to all the Robins.

(MRS.) GLADYS H. PANIS
P. O. Box 705, Falmouth, Mass.

NEW ALOES

Dr. G. W. Reynolds described the following new species of Aloes in the January 1956 issue of "The Journal of South African Botany". From Madagascar: *Aloe millotii* Reynolds, *A. acutissima* H. Perrier var. *antanimorensis* Reynolds, *A. bulbillifera* H. Perrier var. *paulianae* Reynolds, and *A. itremensis* Reynolds. From Kenya Colony: *Aloe ukambensis* Reynolds.

FOREIGN SUBSCRIBERS

You can obtain books published by Abbey Garden Press in exchange for postage stamps. The stamps may be new or used but they must be *complete sets*. Thailand, Philippine Islands, Russia, Ethiopia, New Zealand, Africa, and European countries are desired. This exchange service should make it possible for our foreign subscribers to obtain the cactus books that they desire. Address Dept. S., Cactus Journal, 132 W. Union St., Pasadena, California, U.S.A.

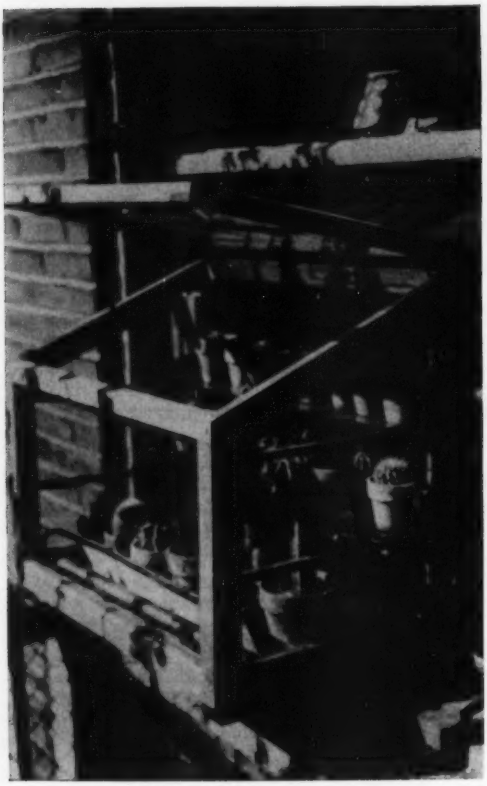

FIG. 21

FROM MONTREAL, CANADA

To all those less-fortunates in the cold north or elsewhere, the following might be of interest. To extend the growing season beyond the two "safe" months in these regions (July-August) I use the greenhouse illustrated in the photograph. It has safely kept the temperature 25°F. above outside, when required. It is a handmade affair with the following features:

Frame 7/8 x 1 5/8 in. pine wood which is light and strong. Double "Diamond" glass. Sheet metal tray at bottom, partly filled with sand. Plate-glass shelves on maple wood rods hooked into brass hooks (at 3 in. intervals to adjust height). Custom made tubular 125 W. heater 24 in. long, shop made, gives better heat distribution and lower surface temperature. Standard strip heaters could not be used ("Chromalox" etc.). Asbestos and chrome mat, angle bent (asbestos facing heater prevents pots being heated directly). Thermostat is T44A "Minneapolis Honeywell" or equal, 56-80° range, with thermometer (top left of greenhouse). Aquarium type thermometer facing towards inside, (just visible behind *Echinocactus grusonii,* lower plate glass shelf). It shows minimum temperatures prevailing which is usually 4-5° lower than top thermometer.

The outside finish has three coats of clear, boat varnish "Navalite" or equal. Mounting detachable on four hooks. During summer months a thin, white cloth on top and front to diffuse the light (front removed). The total material cost is quite low with the heater, thermostat, and wood, being the main items, plus patience and "elbow grease."

Several Opuntias have outgrown the confines of the greenhouse and I have not solved the problem of their disposition to the satisfaction of my wife! She dislikes water spots liberally distributed over the livingroom floor, but from here on every man is on his own! If there are further details anyone might be interested in, please contact Kurt Barnett, 9725 Fulton, Montreal, Que., Canada.

FROM T. MAC DOUGALL

The note in the January-February issue of the Journal may have caused our readers to look for many cactus and succulent novelties, from southern Mexico, this year. It prompts me to make a few observations. Of recent years my discoveries in cacti and succulents have been reduced to a very few numbers per season. However, there is a back log of numbers, some dating back more than twenty years. These "remain" to be drawn on.

Until a few years ago the plants were secure with the collections of the N.Y.B.G. Then major repairs were undertaken on the Garden greenhouses. This was followed by a naturalistic rearrangement of the plant exhibits. As a result, I find only a remnant in the N.Y.B.G. of plants I had collected.

This year the plan is to make a new start, with re-collections going to California—the idea being to find "safety in numbers," of growers. The re-collection of lost numbers is apt to be a chore put off for the "more convenient time" which new projects may indefinitely postpone.

All of this is to inject a note of cautious optimism. The writer is no longer able to give priority to cacti and succulents, but he has the pleasure of collaborating with Mexican authority—Dr. Helia Bravo—and he hopes to see Dr. George Lindsay doing more field work down here.

T. MAC DOUGALL
Hotel Istmo
Tehuantepec, Oax.
Mexico

ROOT-KNOT EELWORM

Mrs. Gertrude Beahm has called our attention to the fact that the Journal article on page 12 of the last issue made no mention that the root-knot eelworm is our *popular* "nematode" in California. The above mentioned article should be re-read with this fact in mind. Nematodes thrive best in light soil in mild climates. Free samples are available!!!

FROM OKLAHOMA

I set 90 percent of my plants in the ground during the summer and have far more flowers than ever before, even large plants. It was no more work than watering.

MRS. D. E. SCHULTZ

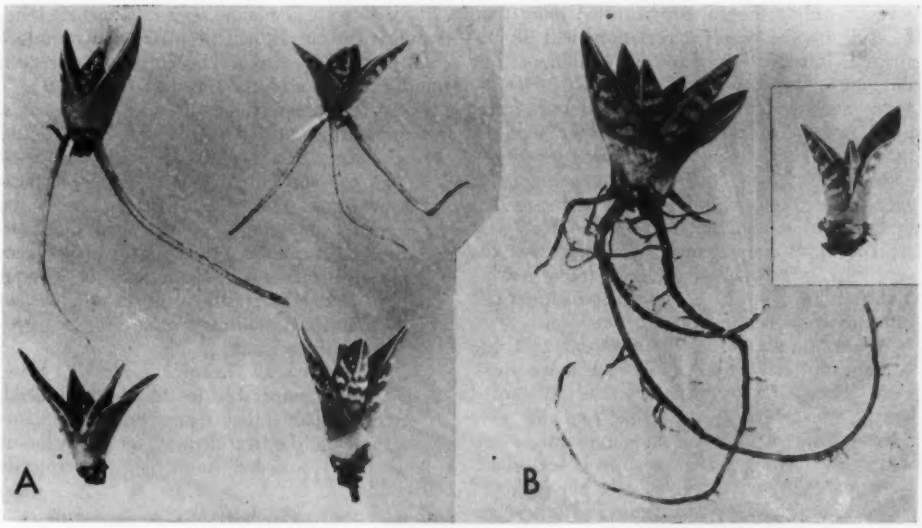

FIG. 1. Control of Pythium root rot of *Aloe variegata* by hot-water treatment at 115°F. for 20 minutes. A) Treated plants above and checks below, 20 days after planting. B) Treated plant at left and check at right, 100 days after planting.

Control of Pythium Root Rot of Aloe Variegata by Hot-Water Treatment

By KENNETH F. BAKER AND RICHARD D. DURBIN

INTRODUCTION

In a local nursery several thousand seedlings of *Aloe variegata* L. were discarded because of a root rot caused by *Pythium ultimum* Trow. and possibly other Pythiaceae. The decay usually began at the root tip, and in a short time progressed back to the stem. Under commercial conditions, the final result was a stunted top with pallid, hard leaves and no roots (Fig. 1). However, if the plants were kept quite moist the fungus advanced into the stem and leaves, reducing them to a soft, watery mass inside of the heavy epidermis, and soon decayed the whole plant. Since 2 to 3 years are required to produce plants for the market, the loss under the prevalent practice of discarding diseased seedlings is considerable.

The principle behind the use of moist heat for killing disease organisms is that the plant can stand more heat than can the pathogen. This method of disease control has been in use since 1882. Aloe can withstand the relatively high temperatures found in its native habitat, Karoo and Namaqualand, South Africa. This fact together with the relatively low thermal tolerance of most Pythiaceae, suggested that hot-water treatment could be used to salvage plants with decayed root systems.

METHODS AND RESULTS

The hot-water treatment can be applied with equal success by the commercial and home grower. It is inexpensive, does an excellent job of eradicating internally borne pathogens, and requires only a simple procedure. The plants should be desiccated by air drying for several days before treatment. The soil clinging to the roots should be washed off and dead refuse pulled off from the stem. A 100-200 gallon tank for treatment is desirable because of greater ease of temperature control, but a sink or tub is adequate. A circulating pump or a wooden paddle should be utilized to agitate the water bath. A trickle of steam or water 20°-25°F. above that of the treatment is used to keep the temperature within 0.5°F. above or below that required. Such temperature control, although relatively easier to maintain in large containers, can be achieved in small units with a little practice. The thermometers must be accurate within the treatment range; they may be calibrated against precision thermometers or, as a second choice, against boiling water and a water ice mixture to define the boiling and freezing points, respectively.

Porous cloth bags or wire screen containers are used to hold the plant material during im-

mersion. They should not be filled more than ⅔ full or the water circulation will be restricted. Introduction of too many plants at one time into a small tank will excessively lower the water temperature. A larger bath or fewer plants must then be used. After the required time the containers are removed from the water bath and promptly cooled by immersing in or spraying with clean cold water. The material is then spread out to dry, and is then ready for replanting. It is extremely important that the seedlings be replanted in soil freed of the pathogen by a steam or chemical treatment in order to avoid reinfection.

About 500 plants of *Aloe variegata*, 1, 2, and 3 years old, have been given the above treatment. The plants were those actually discarded by the nursery because of root rot, and were selected only to the extent of eliminating a few with rotted tops. After treatment the plants were planted in pasteurized light sandy loam; the untreated checks were planted in other containers of the same treated soil. The soil was kept very wet and the plants held in a cool, humid greenhouse, conditions most favorable for the development of the disease and apparently so recognized by growers.

Three tests were conducted at different times using, variously, water at 104, 109, 115, 120, 125, 130 and 135°F. for 20 minutes, 115°F. for 30 minutes, and 115 and 120°F. for 40 minutes. Temperatures lower than 115°F. did not consistently kill the pathogen, and those of 120°F. and above frequently were injurious. The treatment at 115°F. for 20 or 30 minutes eradicated the fungus without injury to the host, but the 40 minute period produced some subsequent drying of the outer leaves and might be regarded as excessively damaging. The treated plants very quickly formed new roots, which in 20 days were in some cases 2 inches long, whereas the checks had been unable to produce new roots (Fig. 1, A). The difference was even more pronounced after 100 days (Fig. 1, B).

Under commercial conditions, the use of a water treatment at 115°F. for 30 minutes would be advisable, but this may be reduced to 20 minutes for very small plants. If large specimens, such as seed-bearing plants, are to be treated the time might be extended safely to 40 minutes. A number of such large plants were successfully freed of Pythium root rot without injury in 1954 by treatment at 115°F. for 40 minutes, and thus returned to useful seed production for the nursery.

Limited tests with *Haworthia attenuata* Haw. gave results comparable to the above. Indeed, it seems probable that many succulent plants would tolerate the treatment and that salvage of plants now discarded might be economically effected.

SUMMARY

Pythium ultimum causes an important root rot of young nursery plants of *Aloe variegata* in California. Because heat treatment of the plants will free them of the pathogen, the prevalent costly practice of discarding infected plants is unnecessary. A hot-water treatment of infected plants at 115°F. for 20 to 40 minutes, depending on the size of the plants, kills the parasite without injury to the host. It is essential that treated material be replanted in soil free of the pathogen.

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Department of Plant Pathology
University of California
Los Angeles 24, California

A Helminthosporium Stem Rot of Cacti

By Richard D. Durbin, Lily H. Davis, and Kenneth F. Baker

In the spring of 1954 a very destructive stem rot was first identified on seedlings of several genera of cacti in southern California nurseries. The disease was largely restricted to seedlings less than 3 in. high and younger than 2 years. Losses in some species commonly reached 50 per cent. All plants in individual flats often were diseased. The growing of cactus plants is so difficult, largely because of disease losses, that few growers will undertake their production from seed. Of the more than 40 growers of cactus and succulents in southern California, only 6 produce the majority of the estimated 1½ to 2 million seedlings grown here annually.

Seedlings are grown in flats for 2-6 months, depending upon the variety. They are then transplanted into other flats, 400 per flat. At this stage the tender cotyledons are easily injured in handling, but the spines, if present, have not hardened and cause no injuries. The plants grow rapidly and within 6 months to a year are in contact and ready for a second transplanting, 100 per flat. Some varieties, however, are ready for sale at this time. As the spines harden, injuries occur more frequently due to punctures or breakage of spines. It is during this period that the disease causes its greatest loss. When the seedlings have become crowded, they are dried off and dug, shaken free of soil, and thrown in piles for 24 hours or longer.

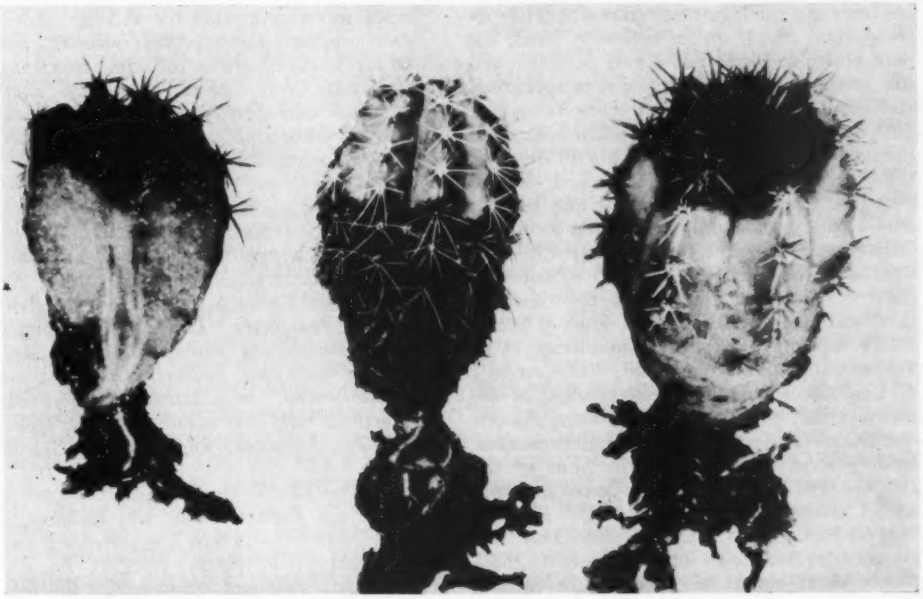

FIG. 1. Left to right: internal view of *Cephalocereus tetetzo* showing cortical rot and vascular discoloration, bottom rot on *C. mezcalaensis*, and top rot on *C. tetetzo*.

They are shipped in this condition in either boxes or bags, or they may be potted for later sale. In either case many injuries result and infection commonly occurs.

Although nurserymen have seen the disease in this area for many years, a literature survey indicated that the only previously published report of its occurrence in the United States was from Texas where it was found on *Echinocereus chloranthus* (Engelm.) Rumpler. The disease was first reported in Czechoslovakia by Petrak in 1928-29 on seedlings of 5 genera of cacti. He believed that the causal Helminthosporium had been introduced on seed from Mexico in 3 successive years, since the disease did not appear in plants grown from other seed sources. It was observed in Italy by Bongini prior to 1932 on 3 genera of cacti. Flachs observed the disease in Germany on 5 genera in 1933 and considered that it was introduced with seedlings from Mexico.

SYMPTOMS.—The disease in California is apparently restricted to seedling cacti and is most serious in very young plants, decreasing in occurrence as the plants mature. While this incidence is partly due to greater susceptibility in the seedling than in later stages, cultural operations are a contributing factor.

In young seedlings, infections are likely to develop on the cotyledons, and plants rot rapidly. In older plants the disease usually appears as a top rot beginning on the shoulder or growing point or, sometimes, as a basal rot occurring near the soil surface. At first the lesions appear yellow, but these rapidly enlarge and become dull dark green and water-soaked, or dark brown, depending on the conditions and species. The areas have well defined margins and may be either unilateral or uniform on all sides. Under continued moist conditions the entire plant is converted within 2-4 days into a watery mass contained by the epidermis. Under dry conditions the infected tissues collapse, the lesion appears as a smooth sunken dark brown area, and enlargement practically ceases. With the return of moist conditions, the fungus rapidly spreads and a dark brown mass of spores is formed. The final stage in any case is a shrunken dark brown mummy covered with spores (Fig. 1).

Certain other diseases of cacti might be confused with this one. *Phytophthora cactorum* (Leb. & Cohn) Schroet. and *Pythium debaryanum* Hesse cause root and collar rots in which the affected tissues also become soft and watery and vary from brown to black. These water molds, however, always attack from the base upwards, the roots are involved, and the dark brown sporulation typical of the Helminthosporium disease is lacking. *Fusarium oxysporum* (Schlecht.) Snyd. & Hans. and *F. aisphaeria* (Tode) Snyd. & Hans. cause tip and basal rots,

but may be distinguished from the Helminthosporium disease on the following bases: the dark brown to black lesions have persistent yellow margins, the rot is dry and slow spreading, and the affected tissues may show masses of pink sporulation. *Rhizoctonia solani* Kühn also produces a collar rot in cacti, but in this case the tissues assume a brown, shrivelled, dry appearance. Coarse mycelial strands may be seen with a hand lens, and no sporulation occurs.

HOST RANGE.—The fungus apparently is restricted to the Cactaceae within 5 subtribes of the tribe Cereeae, according to the classification established by Britton and Rose. It occurs on 16 spp. or varieties of Mammillaria, 13 of Echinocactus, 9 of Echinocereus, 7 of Cereus, 7 of Cephalocereus, 2 of Lophocereus, 2 of Lemaireocereus, and 1 each of Espostoa, Pilocereus, Selenicereus, Astrophytum, and Ferocactus. Under recent classifications, the hosts of the fungus occur in the subfamily Cereoideae and, with 1 exception (Selenicereus of the tribe Hylocereae) are all in the tribe Cereeae. This tribe is further broken down into 2 sections: 1) those plants whose origin lies south of the tropical belt, and 2) those plants whose origin lies north of the tropical belt. It is interesting to note that all of the affected genera fall into the latter group, and that the native habitat for most of them ranges from Mexico to the southwestern United States.

Hosts reported in this list include: *Astrophytum ornatum; Cephalocereus palmeri, senilis, apicicephalium, tetetzo, collinsii, sartorianus, mezcalaensis; Cereus azureus, dumortieri, eburneus, geometrizans, stellatus, marginatus, peruvianus; Echinocactus corniger, durangensis, echidna, electracanthus, ingens, grusonii, longihamatus, lophothele, macdowellii, robustus, pilosus, saussieri, uncinatus; Echinocereus caespitosus, delaetii, dubius, glycimorphus, caespitosus* var. *tamaulipensis, sarissophorus, stramineus, pectinatus rigidissimus, chloranthus; Espostoa lanata; Ferocactus* sp.; *Lemaireocereus martinezi, dumortieri; Lophocereus schottii, gatesii; Mammillaria chinocephala, conoidea, difficilis, geminispina, heyderi, lasiacantha, leona, macromeris, meiacantha, melanocentra, pseudorekoi, valida, rhodantha, strobiliformis, scolymoides, hahniana; Pilocereus* sp.; *Selenicereus* sp.

THE PATHOGEN.—The organism consistently isolated from diseased plants was *Helminthosporium cactivorum*, which was described and named in 1931 by Petrak. In 1932 Bongini studied this disease and, unaware that the fungus had already been described, named the pathogen *Helminthosporius cactacearum*. She was undoubtedly dealing with the organism involved in the present study and the one described by Petrak, whose binomial is the accepted one for this fungus. The fungus studied

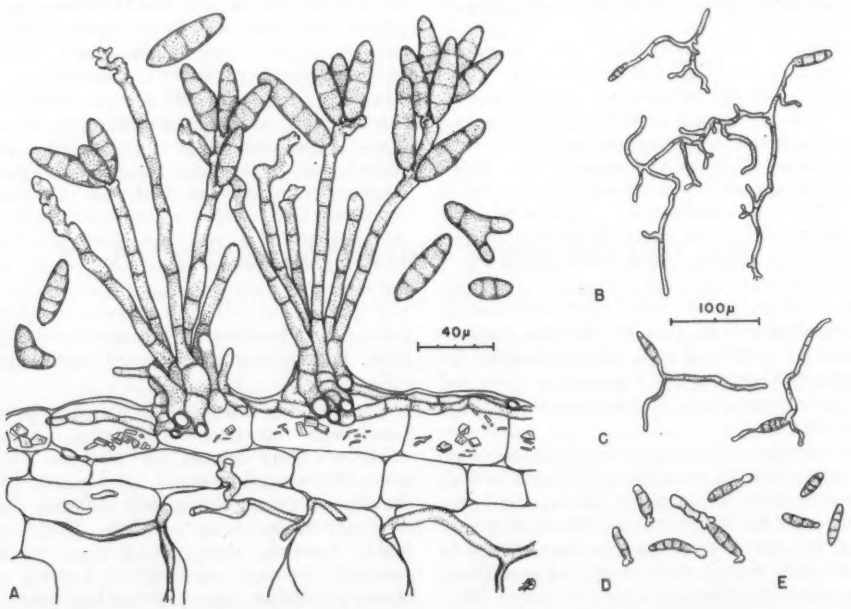

FIG. 2. *Helminthosporium cactivorum*. A) Conidia and conidiophores arising from stromatic masses in host tissue. B-E) Effect of fungicides on spore germination after 4 days. B) Check, C) zineb, D) captan, and E) ferbam.

in California agreed in all particulars with that described by Petrak.

The disease was reproduced by spraying aqueous spore suspensions of the organism on 60 plants, 8 months old, of *Cephalocereus tetetzo*. Isolations from inoculated plants yielded the original organism. Freehand and frozen sections of infected tissues revealed much cell disorganization and breakdown of chloroplasts. The mycelium is intercellular, hyaline, densely granular, and aggregates in the subepidermal tissues into parallel rows of hyphae which form light brown stromatic masses from which the conidiophores arise (Fig. 2).

In studies on the mode of entry of the pathogen into the host, water suspensions of conidia from single spore cultures were sprayed onto disease-free cactus seedlings of various genera held on moist filter paper in Petri dishes. The seedlings ranged in age from 1½ weeks to 4 months. Some of the plants were injured by pricking with a needle and some left uninjured. Epidermal strips mounted in lactophenol cotton blue were made at 3-hour intervals to determine the time and method of penetration. It was found that free moisture was essential for penetration, otherwise the germ tubes dried and germination ceased. Infection pegs formed readily after 18-21 hours, and after 48 hours penetration had occurred directly through the epidermis. In only a single instance was stomatal penetration observed. Within 3 days, all injured plants were covered with sporulation. A few uninjured plants exhibited yellowish brown lesions, and on the fifth day sporulation developed. When 1½ year-old plants of *Cereus peruvianus* were used, direct penetration did not occur, although instances of stomatal penetration were observed. When the plants were injured, penetration occurred readily and the plants rotted within a week.

CONTROL.—An exploratory glass-slide assay was run, using a suspension of Helminthosporium spores, to find an effective fungicide. In 13 hr. there was no germination on slides sprayed with captan (n-(trichloromethylthio)-4-cyclohexene-1, 2-dicarboximide) or ferbam (100% ferric dimethyldithiocarbamate) at 2 lb. per 100 gal. Spore germination was approximately 3% on slides sprayed with zineb (zinc ethylenebis [dithiocarbamate]) at 2 lb. per 100 gal. and 100% on control slides sprayed with water. After 4 days there was still no germination on slides sprayed with ferbam, and on those sprayed with captan spores bore abnormal "knobs". Germination was 100% in the presence of zineb and in the controls (Fig. 2).

As a result of these tests spray trials were run on seedlings of *Cephalocereus tetetzo* 1½ in. high (slightly more than 1 year old) in flats using ferbam, captan, and zineb. Fungicide concentrations equivalent to 2 and 4 lb. per 100 gal., plus 6 fl. oz. DuPont Spreader Sticker were employed, using 40 plants for each treatment. The sprays were applied and allowed to dry, then the plants were heavily inoculated with a spore suspension and covered with plastic and cheesecloth for 1 week. Effective control was obtained using captan or ferbam at either the 2 or 4 lb. level on a 10- to 14-day schedule. However, ferbam is objectionable for use on cactus seedlings because of the conspicuous black spray deposit that collects in the spine cushions. Zineb was ineffective, even at the 4 lb. level. The percentages of diseased plants after 17 days were 52.3 for the inoculated check, 14.5 for the noninoculated check, 14.6 for zineb, 5.5 for ferbam, and 4.0 for captan.

In the nursery a complete sanitation program is necessary for effective control. All diseased plants should be removed from the flats at intervals and burned to reduce the inoculum potential of air-borne spores. A soil sterilization program using either steam or chemicals should be practiced to eliminate possible carry-over of the pathogen. It would be a wise precaution not to plant new seedlings in a glasshouse where old infected plants are growing. Captan sprays (2 lb. per 100 gal., plus 6 fl. oz. DuPont Spreader-Sticker) should be applied on a 10-day schedule. A commercial nursery that followed the procedures resulting from this work has achieved successful control.

SUMMARY.—A top or basal rot caused by *Helminthosporium cactivorum* Petr. has been observed in southern California nurseries on several genera of cacti. Initial symptoms are well-defined yellow lesions that later become dark brown. Entire plants may rot in 2-4 days. In older plants the fungus enters through stomata or wounds, while in young plants direct penetration is also common. The mycelium is intercellular and produces conidiophores that break through the epidermis or stomata. Abundant sporulation occurs under moist conditions. Successful control has been achieved by 1) applying 2-4 lb. captan per 100 gal., plus 6 fl. oz. DuPont Spreader-Sticker on a 10-14 day schedule, 2) roguing diseased plants, and 3) sterilizing the soil.

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A Method for Separating Cactus Seed

By RICHARD D. DURBIN

When growing cacti from seed, growers occasionally find species which have their seeds embedded together in mucilaginous masses. It is only with difficulty that the mass is broken apart mechanically, and then with resultant seed damage. Soaking has little effect other than to rehydrate the gum. An effective method has been devised for separating seed of *Lemaireocereus dumortieri* (Scheidweiler) Br. and R. and *Escontria chiotilla* (Weber) Rose, which also can be used for other species of cacti.

The gum derived from the fruit pulp seems to be composed of pectin or pectin-like compounds, which are essential components of cell walls in all higher plants and are sometimes found in high concentrations in fruit. As such, they are attacked and chemically converted into more water-soluble forms by pectic enzymes. Utilizing this fact, seeds of the 2 above named species were treated with various concentrations of a commercial pectic enzyme preparation[1] for varying times in glass jars. Results indicated that soaking the balls in a 3% enzyme mixture (1 oz. per qt. water) for 48 hrs. was the most effective treatment. The time will undoubtedly depend upon the species to be treated and it can be altered to fit the situation. The treatment should be terminated when the aggregations have disappeared and the seeds are found free in the bottom of the container. The liquid is then poured off, the seeds rinsed in water, and then either dried for later usage or planted immediately. This treatment has not decreased seed germination.

DEPARTMENT OF PLANT PATHOLOGY
UNIVERSITY OF CALIFORNIA
Los Angeles 24, California

[1]The enzyme in powder form under the name Pectinase is available from Nutritional Biochemicals Corp., Cleveland 28, Ohio or local biological supply companies. Make solution only as needed.

FROM NEW YORK

You might be interested in some notes from an amateur cactus-grower in Metropolitan New York who has to employ make-shifts and has learned a thing or two in the process.

PLASTICS—the lifesavers! . . . Small pots do dry out. I tried planting in boxes, four inches tall by six wide by thirty-two long, for south windowsills (indoors). This was fine, except that the stronger and longer rooted varieties went all over the place, underground, and as they grew and shoved the smaller plants aside I had to get them out and into pots. Doing this involved some digging and consequent damage both to their roots and those of the more permanent residents. Solved this neatly, I thought, by cutting strips of heavy plastic such as is used for covers of brochures occasionally. Made these high enough to come just below the soil level when stood on end in the box, and long enough to stretch the full length; another set same height but to run across the width. Cut rabbets into them (both sets) halfway, and fitted them together like the inside of an egg-box. Set them in the box and put the plants into them like I would into pots. Net effect was an apparently homogeneous plant-box but each plant was allowed its own space and could not get through to choke out a neighbor. When one required more room it could be extracted without damage to the neighbors or untangling roots, and transplanted to a larger pot or a larger niche in the box. These niches of course can be made any size, all the same or different sizes in the same box.

Plastic "parts" boxes available in all sizes, with square compartments and hinged lids, make fine contraptions to start seeds and grow seedlings in. Set in the sun, the lids can be closed or, in the case of started seedlings, propped half-open and the backs painted with white to provide light shade.

The 5 & 10 have wrought-iron framework trays intended to hold glasses. Some for four and some for eight. They take the dime store's 3½ in. painted pots beautifully. Pots cannot be knocked over and can be handled as a group. Trays have rubber footed short legs and two of them end-to-end fit nicely on the average windowsill.

Getting back to plastic, this stuff in sheet form also makes fine "glasshouses"—unbreakable and easy to handle for the outside windowsill. Plastic curtains provide just the right amount of "light shade" for south windows in the summer, too. Will not tangle in the spines if the window is open and the wind blowing, as will everything else I have tried.

Was much interested in Richard L. Russell's story of his apartment-house windowsill greenhouses. He says though that his summer temperatures inside the greenhouses "go to 100 in the sun". On MY apartment-house windowsill they run to 110 and UP—or did last summer. Even the *Echinocactus horizonthalonius* started to burn and had to be shaded.

Have another makeshift that might interest readers in my area. Reynolds Aluminum make an aluminum grillwork in sheets about 40 in. square, intended for radiator grilles and such. I find this, cut to size so it will snap into and out of the windowframe on the outside, makes a fine "lath house". The window can be raised and lowered without interference from the thin aluminum sheeting, the air comes through as though there were nothing there, the aluminum reflects back outdoors about 98% of the hot sun's heat that hits it, thus cooling the room somewhat, and the openings in the grille admit plenty enough sunlight for the less voracious sun-worshippers.

Perhaps I ought to mention that I keep my plants in a south window, on the sills to which I have fitted nine-inch extension shelves. I have about 48 plants, I think, not counting a batch of seedlings started last fall and growing all together in a large pot. Planted *Notocactus pampeanus* and *Parodia aurespina* and all came up. Lord knows what I will do with them! . . . Started this business about a year ago, I guess, with one plant from the ten-cent store. Have been getting everything from Johnson's Cactus Gardens and find them very satisfactory and particularly inexpensive.

AGNES T. HIRSHINGER

Notes on Haworthias

By J. R. BROWN

Haworthia margaritifera (L.) Haw.

Plant stemless, simple, to 17 cm. in diam., to 14 cm. tall.

Leaves, younger erect-incurved, older spreading, incurving at tips, ovate-deltoid, acuminate, cuspidate, 7-8 cm. long, to 3.5 cm. broad toward the base, to 10 mm. thick, deep green in color; face of leaf flat to somewhat convex; back very convex, obliquely keeled in upper part; tuberculate on both sides of leaf with white, distinct and never confluent tubercles, face more sparsely tuberculate than the back, tubercles large and pearl-like, becoming concolorous with age.

Peduncle stout to 5 mm. in diam., deep green to brownish-green, branched, to 70 cm. tall including racemes; pedicels to 5 mm. long, bracts to 4 mm. long, deltoid-acute, brownish with a darker keel; perianth to 14 mm. long, tube ob-

FIG. 25 *Haworthia margaritifera* (L.) Haw. nat. size

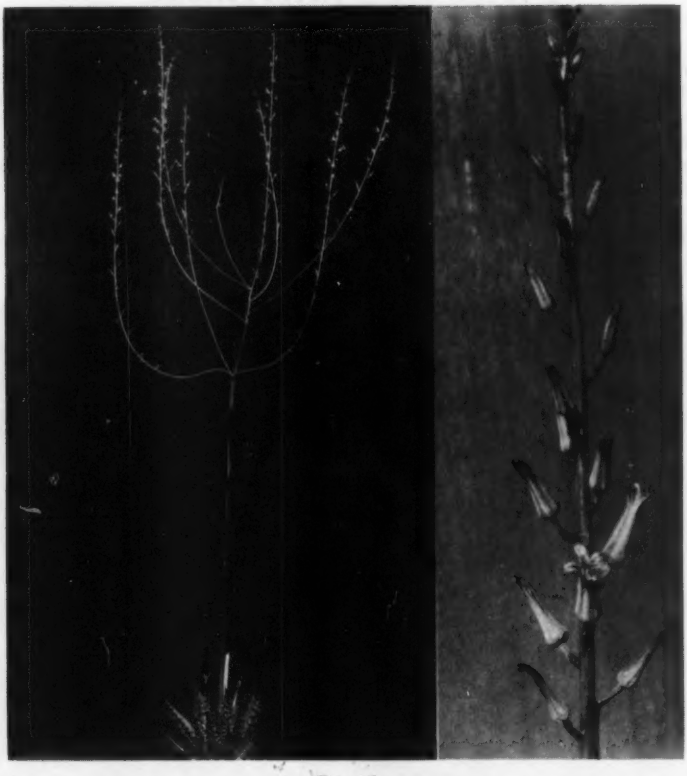

FIG. 26
Haworthia margaritifera (L.) Haw. (left) plant in flower, greatly reduced; (right) flowers nat. size

clavate, subcylindrical, to 4.5 mm. diam. toward base of tube, pale green with darker green striate lines, segments short, channeled, greenish-white with green lines, the tips tinged reddish-brown, 3 lower segments with wavy or crinkled tips, upper segment somewhat broader and flatter.

Type locality: Unknown.

Introduced to Europe early in the 18th century.

The name *margaritifera,* which means pearl-bearing, refers to the white pearl-like tubercles. Haworth called it the "Pearl" Haworthia.

Salm in his Monograph (l.c.) mentions that *Haw. margaritifera* proliferates from the axils of the leaves; this is also stated by Berger (l.c.). Many fine mature specimens of this Haworthia have been received from South Africa and these have always been and have remained simple plants and never proliferous in any manner and I have had plants of this Haworthia in cultivation for 25 years.

The plant shown in the illustration of this Haworthia was sent to me by Miss K. C. Stanford of Stellenbosch in 1935, at which time she collected it at Brandt Vlei just outside Worcester. "They were growing on the slope of a koppie and there was a Kaffir encampment right on top of them and they were walking over and sleeping on splendid specimens of *Haw. margaritifera.*"

The plant of this Haworthia which is shown in Desert Plant Life (l.c.) was collected in the Great Brak River area and is a comparatively young plant. The plants from this area are not quite as rough looking as those from the western part of its range as the tubercles are somewhat smaller, but the plants attain the same large size, as I have received some magnificent specimens from Mrs. van der Bijl of Great Brak River in bygone years.

This Haworthia has been recorded from various localities in Cape Colony including Matjesfontein, Worcester, Bonnievale, Ashton, and Great Brak River.

Thos. Cooper in a paper entitled "A few remarks on Haworthias and Apicras," when referring to the isolated manner in which these plants are usually found, mentions that he met with one exception to this isolated condition in the

Margaritifera group. He found species growing together in the district of Worcester, Cape of Good Hope; they were growing on Karoo land, over a considerable tract of country, in large roundish patches, but growing intermixed; namely, *H. margaritifera, H. erecta, H. papillosa,* and *H. subpapillosa;* and he also states that this is the only instance in which he found Haworthias growing in such abundance. This paper appeared in the old English periodical, The Cactus Journal vol. I, 1898.

Haworthia margaritifera (L.) Haw. Suppl. (1819) 55; Poelln. in Repert. Sp. Nov. XLIV (1938) 213; Berger in Pflanzenr. IV. 38. (1908) 87, fig. 28 F-H; Bak. in Journ. Linn. Soc. XVIII (1880) 204, in Th. Dyer, Fl. Cap. VI (1896) 341; Marl., Fl. So. Afr. IV (1915) 86; J. R. Brown in Des. Plt. Life VI (1934) 119, fig. *Aloe pumila* var. *margaritifera a* L. Sp. (1753) 322, excl. syn. Comm.: *Aloe pumila* var. *margaritifera* Thunb. Diss. (1785) no. 8 p.p., Prod. (1794) 61 p.p., Fl. Cap. ed. Schult. (1823) 311 p.p.: *Aloe margaritifera* Mill., Gard. Dict. ed. 8 (1768) 14; Lam., Encycl. I (1784) 88 excl. syn.; Ait., Hort. Kew. ed. I (1789) 468 excl. var. *media* & var. *minima;* Willd., Spec. II (1800) 188 excl. syn.; Roem. & Schult., Syst. VII (1829) 648; Salm, Hort. Dyck. (1834) 320, Monogr. (1840) sect. 6, fig. 5; Kunth, Enum. IV (1843) 502. *Aloe margaritifera* var. *major* D. C. Pl. grass. (1799) sub t. 57, excl. syn. Comm.; Haw. in Trans. Linn. Soc. VII (1804) 11; Salm, Cat. (1817) 5. *Haw. major* Duval, Pl. succ. Hort. Alenc. (1809) 7; Haw., Syn. (1812) 92. *Apicra margaritifera* & var. *major* Willd. in Berl. Magaz. V (1811) 269 excl. syn. Dillenii. *Haw. margaritifera* var. *typica* Berger, l.c. 88.

Illustrations: Lam., Illustr. (1784) t. 256, fig. 2; Bradley, Succ. III (1725) t. 21; Bois, Dict. Hort. (1893-1899) 649; Engl. & Drude, Veg. d. Erde IX, II (1908) 318; Roeder, Sukk. (1931) t. XXXIV; Jacobsen, Sukk. (1933) fig. 68, Sukk. Pl. (1935) & ed. II (1946) fig. 85, Handbuch Sukk. (1954) fig. 628; Succulenta XV (1933) 58; Succ. Amateur (1939) fig. 251.

EXPERIMENTAL LIGHTING

My Dear Mr. Johnson:

I noted your question on lights in the Nov.-Dec. issue and do not go along with many people that the lights answer to all growing problems.

Three years ago I used our upstairs sitting room for a light setup and had seventeen batteries using many different combinations of lights, red or rose and cold white, blue and cold white, rose and sunlight, blue and sunlight, cold white and sunlight, both cold white and both sunlight, and also rose and blue. I kept strict data. All had the same amount of moisture and ventilation and do not think I had any outstanding results and could not notice any difference in growth under the different combinations. After figuring the cost etc., decided to have a greenhouse and now only use my lights for the overflow or starting bulbs and seeds. Except for Episcias and African Violets and even these are removed as soon as buds appear.

This past year have tested out cactus in the following ways and think the results might be of interest to your readers.

1—30 potted plants, including a mixture of different varieties Elk Horn, Panda, Kalanchoes, Crassulas, Haworthias, Paper Spine, Plaids, Chins. The table is set in a cool part of the living room across an outside door and the pots grouped around a table lamp which has a yellow insect bulb in it and they are given about 12 hrs. light. I move the pots around just to be sure that no one pot receives more light for a longer period than the others. Have found the results excellent, a good healthy growth not too fast.

2—30 potted plants in the dark part of the living room against an outside wall and this end is also cool. This is lighted with a 150 watt frosted bulb about 12 hours per day and plants moved around as above. In this collection Haworthias, Parodia, Angel Wings, Stapelias, Scarlet Paint Brush, Sedum, Aloes, some miniature tree types. These also are doing well.

3—Under Flu. lights about 12″ above the plants I had for a time the following: Orchid Cactus, Echeverias, Crassulas, Aloes, Gold Lace, Ribbon Opuntias and some broken leaves and plants broken in shipment. In the mature plants I could not see any difference in growth from the ones under the ordinary bridge lamps but on the broken bits found they rooted very quickly. These were in Spaghnum Moss and in no time they filled 2″ pots with young plants.

This data might help someone who is thinking of using lights and would suggest they try the ordinary table lamps before investing in fluorescent lights which run from $12.00 up according to the size. All plants should be removed from under lights about a month before a show or selling and also when the buds appear if you wish to have plants and flowers that will last.

M. C. Cogswell, New York

UNIVERSITY OF CALIFORNIA PUBLICATION

Doctors T. H. Goodspeed and H. E. Stork have just authored a new book of sixty-four pages entitled "The University of California Botanical Garden Expeditions to the Andes (1935-1952) with Observations on the Phytogeography of Peru." A map shows the area traversed by members of the five expeditions in the countries of Colombia, Peru, Bolivia, Chile, Argentina, Uruguay, and Paraguay. Individual itineraries can be traced, in terms of general areas, by reference to the numerical tabulation of the Expedition's herbarium collections which includes locality, date, and collector corresponding to each number.

Herbarium collections made by the first four expeditions number 13,328 a great number of which were made by the late James West and include many cacti. The fifth expedition was made by Society Member, Paul Hutchison, and includes 685 numbers. Although most of the material has been identified this book does not list the plants by name. Journal readers will hear more about the cacti collected in this fifth expedition in future issues of this magazine.

New Bolivian Cacti - Part 4

By Prof. Martín Cárdenas

Cleistocactus tarijensis Cárdenas, sp. nov.

Caespitosus, calumnaris, 60-70 cm. altus. Ramis temperato viridis, 4-5 cm. crassus. Costis plus minusve 20, obtusis, 2-3 mm. altus, 5 mm. latis. Areolis 5-8 mm. separatis, prominentibus, circularibus, 3 mm. diam., albido tomentosis. Aculeis circa 20, acicularis, tenuis, ablido hyalinus vel flavidulus 8-25 mm. long., divaricatis, tamen non nunquam areolis cum 3-4 aculeis centralis, flavis horizontaliter vel deorsum direxit. Flores numerosis, tubulosus, 4 cm. long. Ovario 1 cm. diam., temperato viridis, squamis minutis, pilis tenuis, albis praedito. Tubus rubi aurantiacus, nitentus, squamis crassus, 2 mm. long., acutis, parce pilis albis et brunescentes praeditus. Phylla perigoni exteriora lanceolata, acuta, rubra, apice flava; interiora spathulata, magenta a basi albida. Stamina duplo seriata; filamenta filiformia, alba; antherae temperato flavae. Stylo 3.5 cm. long., inferne albido, superne roseo, stamina superans, 10 ramis stigmaticis, flavidulis coronato. Fructo globoso 15 mm. diam., temperato rubis vel viridescente, squamis numerosis, pilis densis, albis praedito. Semina 1 mm. long., atro brunea, nitentia.

Patria: Bolivia, provinci Cercado, departmenti Tarija, prope Tarija, 1900 m.

Columnar, somewhat caespitose, 60-70 cm. tall. Branches fresh green, slightly tapering, 4-5 cm. in diameter. Ribs about 20 obtuse, low, 2-3 mm. high, 5 mm. broad. Areoles 5-8 mm. apart, prominent, circular, 3 mm. diameter, whitish felted. Spines about 20 not clearly differentiated into radials and centrals; shortest ones about 4 mm. long, very thin, white hyaline, medium sized, 8 mm, acicular, thin, whitish hyaline, the longest ones about 25 mm. acicular, straw yellow. Some areoles with 3-4 central spines 15-25 mm. long, yellow and horizontally or downwards directed. Top of the branches, showing a dense cushion of 20-30 mm. long acicular yellow and brown spines. Flowers rather numerous, about 20 from near the top of stems, about 4 cm. long bent above the ovary and with a 15 mm. fauces aperture at anthesis. Ovary 8 mm. high, 10 mm. broad, light green, covered by very short pink tipped scales which bear few short white and light brown hairs. Outer perianth segments about 9 mm. long, 1 mm. wide, linear to lanceolate, acute, red, light yellow tipped; middle segments spathulate, 9 mm. long, 2 mm. wide, red, magenta framed and yellow tipped; inner ones, spathulate, 10 mm. long, 3 mm. wide, round tipped, magenta, whitish at the base. Stamens in two rows, lower ones 2.5 cm. long, upper ones 1 cm. long; filaments filiform, thin, white; anthers light yellow. Style about 3.5 cm. long, slightly longer than the stamens, whitish below, pinkish above. Stigma rays about 10, light yellow, 5 mm. long. Fruit globose, about 15 mm. in diameter, light green below, light red above with numerous light green or reddish scales bearing a dense white,

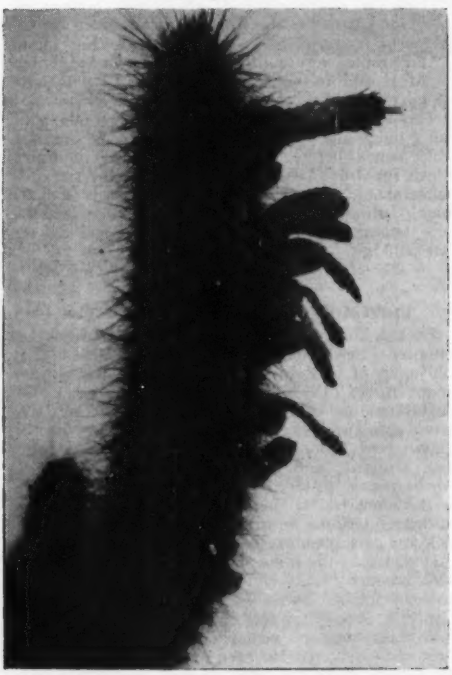

FIG. 27
Cleistocactus tarijensis sp. nov. x0.5

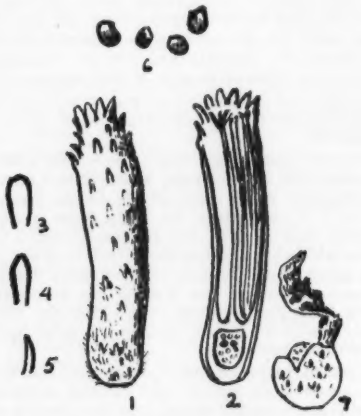

FIG. 28
Cleistocactus tarijensis sp. nov., 1-2 flower x1.0; 5, 4, and 3 outer, middle, and inner perianth segments x1.0; 6 seeds x6.0; 7 fruit x1.0

silky curled hairs. Seeds 1 mm. long, dark brown glossy.

Bolivia. Provincia del Cercado. Departamento de Tarija. Colinas proximas a la Ciudad de Tarija, 1900 m. Marzo de 1952, M. Cárdenas, No. 5050 (Type), in Herbarium Cardenasianum. Cotype in U. S. National Herbarium.

Obs. The numerous species of Cleistocactus from Bolivia differ in the length of their flowers which are long (about 8 cm.), medium (about 5 cm.) and short (about 3 cm.). This new species however similar at a glance with *Cl. candelilla* Cárdenas, both with medium sized flowers, differs by its lower habit, coarser branches, outnumbering spines and the shape and color of flowers.

FIG. 29
Cleistocactus ressinianus sp. nov. x.01

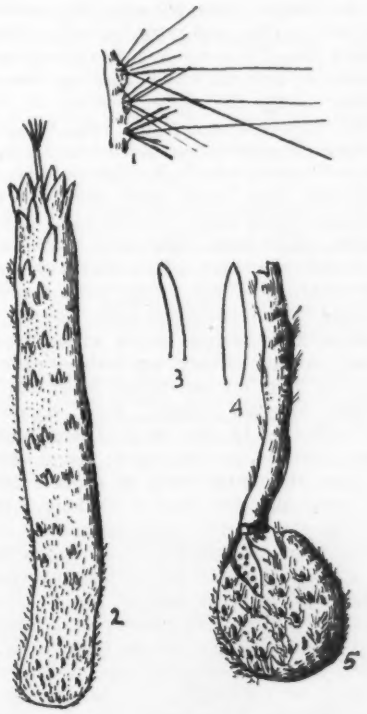

FIG. 30
Cleistocactus ressinianus sp. nov., 1 areoles; 2 flower; 3-4 outer and inner perianth segments; 5 fruit; all x1.0

Cleistocactus ressinianus Cárdenas, sp. nov.

Columnaris a base ramosus, 1.5-2 m. altus. Ramis apice paulo angusto, 4 cm. crassus, atro viridis. Costis plus minusve 22, tranverso sulcatis, obtusis, 4 mm. altus, 5 mm. latis. Areolis 5 mm. inter se distantibus, circularis prominentibus, cinereo tomentosis. Aculeis 8-15, tamen non nunquam areolis cum 3-4 centralis; omnes aculeis acicularis, rubi brunescentes, divaricatis adhaerans. Flores numerosis ex longitudo ramis, zygomorphis 7-8 cm. long., purpureo magentibus. Ovario, 1 cm. diam., globoso, squamis 2-3 mm. long. acutis, temperato viridis, apice purpurei, pilis densissimis, diluto bruneis, nitentis, praedito. Tubus 5 cm. long., 1 cm. diam. superne et inferne constrictus, squamis 4 mm. long, acutis, purpureis, pilis salmoneo bruneis, densis, praeditus. Phylla perigoni exteriora 1 cm. long., lanceolata, acuta, atro magenta; interiora spathulata 18 mm. long., magenta. Stamina duplo seriali inserta; filamenta inferiora albida, superiora magenta; antherae compplanatae, atro magentae. Stylo 7 cm. long., inferne albidis, superne roseis, exerto, 9 lacinis stigmaticis, temperato viridis coronato. Fructo globoso, magno, usque 3 cm. diam. diluto purpurei flavis, squamis numerosis, pilis salmoneo bruneis vel albidis praedito. Semina 1.2 mm. long., nigra, puncticulata, nitentia.

Patria: Bolivia, provinci Oropeza, departmenti Chuquisaca, in itinere Sucre-Tarabuco, 2,700 m.

Obs. Species detectori et mei discipulus, agronomus Edmundo Ressini dicata.

Plants columnar, branched from the base, 1.5-2 m. tall. Branches slightly tapering; 4 cm. in diameter, dark green. Ribs about 22, 4 mm. high, 5 mm. broad at the base. Areoles 5 mm. apart, separated by transversal furrows, circular, 4 mm. in diameter, prominent, gray felted. Spines not differentiated into radials and centrals, 8-15, some areoles with 3-4 centrals; shortest spines 4 mm. long, medium sized ones, 10 mm.

long, the longest ones 3-5 cm. Top areoles, closer between them and provided with upward directed spines. All spines acicular; young ones, yellowish, old ones red brown, sticking. Flowers numerous along the upper section of the branches, zygomorphic, 7-8 cm. long, tubulous with two slight constrictions above ovary, purple magenta. Ovary 1 cm. high, globose, covered by 2-3 mm. long, acute, light green, purple tipped scales which bear very dense light brown-salmonish, glossy hairs. Tube about 5 cm. long, 1 cm. broad, constricted at both ends with acute purple magenta, 4 mm. long scales bearing dense light brown salmonish hairs. Interior of the tube whitish. Exterior of the whole flower, extremely hirsute. Outer perianth segments, about 1 cm. long, 1.5 mm. broad, linear lanceolate, acute magenta colored; inner segments linear spathulate, 18 mm. long, 2 mm. broad, magenta. Stamens in two rows; lower ones, from above the nectar cavity to about 7 mm. above, lower filaments about 5 cm. long, white below, magenta above; upper stamens 2 cm. long with light magenta below and darker magenta above filaments. All anthers flattened, dark magenta. Style at anthesis about 7 cm. long, much exerted, white below, pinkish above, slightly striated. Stigma rays 9, light green, 4 mm. long. Fruit globose about 3 cm. in diameter, light green or yellowish at its base where it splits at maturity, light purple above, covered by numerous scales bearing dense short light brown-salmonish or whitish silky glossy hairs; pulp white grayish, soft, edible. Seeds 1.2 mm. long, glossy black, puncticulate.

Bolivia. Province of Oropeza. Department of Chuquisaca. On the way from Sucre to Tarabuco, 2,700 m. February 1949, M. Cárdenas, No. 5051 (Type) in Herbarium Cardenasianum. Cotype in the U. S. National Herbarium.

Obs. This species is related by the length of its flowers, with *Cl. buchtienii* Bckbg. but differs by its giant fruits the very hirsute flowers and the sticking spines.

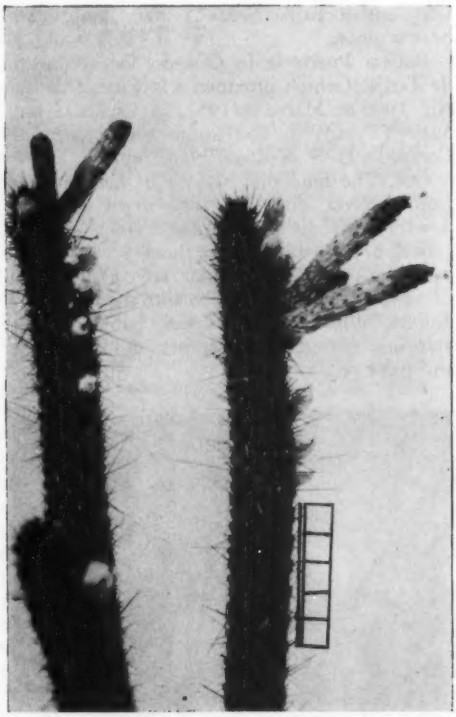

FIG. 31
Cleistocactus rojoi sp. nov.

Cleistocactus rojoi Cárdenas, sp. nov.

Columnaris, erectus, 40-60 cm. altus. Ramis atro viridis, 2-2.5 cm. diam. Costis 17, obtusis, 4 mm. altis, 5 mm. latis, transverso sulcatis. Areolis 8 mm. inter se distantibus, circularis, prominentibus, 3 mm. diam., brunei tomentosis. Aculeis usque 25, radiantibus vix distinguentis in radiales aut centrales, tamen nonnunquam areolis cum 3-4 aculeis centrales, longiores 15-20 mm. deorsum direxit; omnes aculeis acicularis, tenuis 3-20 mm. long., albidis vel bruneis. Flores numerosis, tubulosus a fauce constrictus, 6 cm. long., fere incurvatis supra ovarium, temperato rubus. Ovario globoso 11 mm. diam., atro purpureo, squamis minutis, acutis, albidis, pilis albis, praedito. Tubus 4-5 cm. long., 1 cm. diam., squamis 2 mm. long., rubis, apice flavidulus, pilis albis, praeditus. Phylla perigoni exteriora atro rubra, apice flavo, lanceolata, extra recurvata; interiora spathulata, rosei salmonea. Stamina duplici serialis; inferne 4 cm. long., superne 1 cm. long. Filamenta albo magentibus, antherae flavae. Stylo 4.8 cm. long., albido, stamina aequante, 6 lacinis stigmaticis, smaragdo viridis coronato. Fructo ovoideo, 18 mm. long., diluto purpureo vel roseo, squamis minutis, acutis, albidis, pilis albis, praedito. Semina atro brunea, 1 mm. long., nitentia.

Patria: Bolivia, provinci Entre Rios, departamenti Tarija, in itinere Entra Rios-Villa Montes, 600 m.

Obs. Species, mei singularis discipulus, agronomus Leandro Rojo dicata.

Columnar, erect 40-60 cm. tall. Branches 2-2.5 cm. in diameter, dark green. Ribs 17, rather low, 4 mm. high, 5 mm. broad with transversal furrows among areoles. Areoles 8 mm. apart, circular, prominent, 3 mm. diameter, brown felted. Spines hardly differentiated into radials and centrals. Young areoles with grayish brown felt and 24-25 spines, some of these, bearing 3-4 centrals 15-20 mm. long. downwards directed. Old areoles with about 25 radiant spines which are thin acicular and occasionally thread like whitish to brown. Shortest spines, 3 mm. long, medium sized ones, 4 mm. long and longest ones, 6 mm. long. Flowers

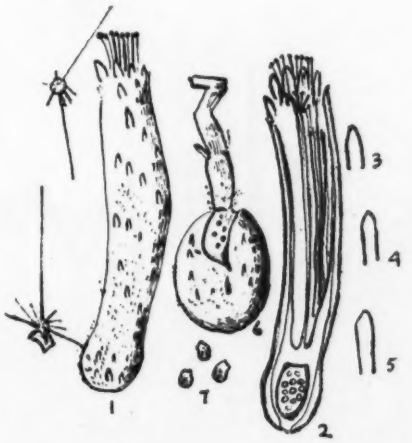

FIG. 32
Cleistocactus rojoi sp. nov., 1-2 flower; 3, 4, and 5 outer, middle, and inner perianth segments; 6 fruit x1.0; 7 seeds x3.0; areoles x1.0

numerous from near the top of the branches, about 6 cm. long, curved above the ovary and slightly constricted at its mouth. Ovary 11 mm. long., 9 mm. broad, dark purple with 1 mm. whitish, pink tipped acute scales bearing dense white hairs. Tube 4.5 cm. long, 1 cm. in diameter, light purple or reddish, covered by 2 mm. long fleshy, red yellowish tipped scales which bear white hairs. Outer perianth segments dark red, yellowish tipped, curved downwards, lanceolate, 12 mm. long; middle segments spathulate 12 mm. long dark red above, lighter below; inner ones spathulate, salmon-pink, 12 mm. long. Interior of the flower tube white. Stamens in two rows; lower ones from 1 cm. above the bottom of the tube to 5 mm. upwards, about 4 cm. long whitish below, magenta above; upper stamens 1 cm. long, purplish, surpassed by the lower ones. All anthers purplish. Style 4.8 cm., white, at the same level or slightly below the stamens. Stigma lobes 6, emerald green, 3 mm. long. Fruit ovoid, 18 mm. long, light purple to pink, covered by minute whitish acute scales which bear white hairs. Seeds dark brown, 1 mm. long, puncticulate, glossy.

Bolivia. Province of Entre Rios. Department of Tarija. On the way Entre Rios to Villa Montes, 600 m. March 1952. M. Cárdenas, No. 5052 (Type) in Herbarium Cardenasianum. Cotype in the U. S. National Herbarium.

This medium sized flower *Cleistocactus,* is clearly characterized by its low and slender branches like those of *Cl. smaragdiflorus* (Weber) Br. & R. and its strawberry red flowers densely covered by fine white hairs.

Cleistocactus ianthinus Cárdenas, sp. nov.

Columnaris, simplex vel a base ramosus, 50-70 cm. altis. Ramis diluto viridis 2.5-3 cm. crassus. Costis plus minusve 10,3-4 mm. altis, 4 mm. latis. Areolis 8 mm. inter se distantibus, 1.5 mm. diam., circularibus, prominentibus, cinereo vel nigrescente tomentosis. Aculeis radiales 10-14, radiantes 2-8 mm. long., centrales unus, 15-30 mm.; aculeis junioribus diluto roseis vel albidis; vetustiores, diluto cinereis; omnes aculei, acicularis. Flores pauci ex circa apice ramis, actionomorphi, 3 cm. long. Ovarium globosum 6 mm. diam., squamis carnosus atro magentibus, apice roseis, pilis brevis, crispus, albis praeditum. Tubus ianthinus, squamis magentibus, apice roseis, pilis albis instructus. Phylla perigoni exteriora alanceolata, acuta, magenta-lilacina, apice, albidis; interiora atro magenta, lanceolata. Stamina partim fundum tubi, 2 cm. long., partim e basim petalis, 8 mm. long.; filamenta inferne alba, superne rosei; antherae magentae. Stylus 2.5 cm. long., stamina superans, albus, 7 lacinis stigmaticis, 3 mm. long., smaragdo viridis, coronatus. Fructo globoso 1 cm. diam., atro magentibus, squamis purpureis, apice albidis, pilis paucis, albis, praedito.

Patria: Bolivia, provinci Charcas, departmenti Potosi, prope Calahuta (Rio Caine), 2,000 m.

FIG. 33
Cleistocactus ianthinus sp. nov.

Columnar plants, simple or rarely branching from the base, 50-70 cm. tall. Branches light green, 2.5-3 cm. thick. Ribs about 10,3-4 mm. high, 4 mm. broad. Aeroles 8 mm. apart, 1.5 mm. diameter, circular, prominent; young areoles gray and old ones, blackish felted. Radial

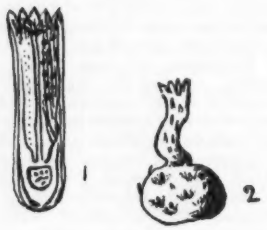

FIG. 34
Cleistocactus ianthinus sp. nov., 1 flower; 2 fruit; all x1.0

spines 10-14, spreading; shortest ones 2 mm. long, medium sized ones 5 mm., longest ones 8 mm. long; central spine 1, 1.5-3 cm. long. Young spines white or pinkish, brown tipped; old ones, light gray, brown tipped. Flowers rather few from near the top of stems, actinomorphic, about 3 cm. long. Ovary globose 6 mm. in diameter with dark pink, light magenta tipped fleshy scales which bear short curled white hairs. Tube magenta-lilac with the same type of scales than ovary and few white hairs. Outer perianth segments lanceolate, acute, light magenta-lilac, whitish tipped; inner segments, lanceolate, dark magenta. Stamens in two rows; lower ones, 2 cm. long; upper ones 8 mm. long; filaments, white below, pinkish above; anthers magenta. Style 2.5 cm. long, surpassing stamens, white. Stigma rays 7, emerald green, 3 mm. long. Fruit globose, 1 cm. diameter, purplish with purplish, white tipped scales bearing few white hairs.

Bolivia. Province of Charcas. Department of Potosi, about Calahuta on the Rio Caine mountain slopes, 2,000 m. November 1949. M. Cárdenas, No. 5086 (Type) in Herbarium Cardenasianum. Cotype in the U. S. National Herbarium.

Obs. This new *Cleistocactus,* is characterized by its low habit, whitish thin spines, and particularly its short tubular magenta-lilac (ianthinus) flowers bearing few white hairs. Ordinarily, the flowers of *Cleistocactus* are strawberry or wine red colored. A few of them as do *Cl. smaragdiflorus* (Weber) Br. & R. and *Cl angosturensis* Cárd. bear reddish flowers with its perianth segments, emerald green tipped. One species, *Cl. tominensis* (Wgt.) Bckbg. shows on the same branch, flowers which are red, yellow or green. Thus, the magenta-lilac color of the flowers in *Cl. ianthinus,* is quite unusual.

FIG. 35
Cleistocactus ayopayanus sp. nov., between Morochata and Independencia, x0.1

Cleistocactus ayopayanus Cárdenas, sp. nov.

Columnaris, erectus ramosus 1-1.5 m. altus. Ramis temperato viridis, 3.5 cm. crassus. Costis plus minusve 15 obtusis, 4 mm. altis, 7 mm. latis, transverso sulcatis. Areolis 5-6 mm. separatis, ellipticis, prominentibus, 3 mm. diam. cinerei vel nigrescente tomentosis. Aculeis 13-16, acicularis, tenuis, 12-40 mm. long., divaricatis, flavis, aliquid a basim incrassatus. Alabaster denso pilis atro rubis brunescentes clausus. Flores numerosis, tubulosis, 4 cm. long. Ovario 7-8 mm. diam., squamis numerosis, brevis, acutis diluto viridis, pilis atro rubis, copiosis, praedito. Tubus 5 mm. crassus, squamis 4 mm. long., rubis, apice viride, pilis densis, rubis, sericeis praeditus. Phylla perigoni exteriora squamis similiter, acuta 5 mm. long., atro viridia, apice palidiore; phylla interiora acuta, 7 mm. long., atro viridia. Stamina duplo seriali inserta, non exerta; filamenta roseo lilacina, antherae flavae. Stylo 2.8 cm. long., tenuis, 6 ramis stigmaticis atro viridis, 2 mm. long. coronato. Fructo globose, diluto rubis 8-10 mm. diam., squamis numerosis, acutis, temperato rubis, apice albidulo, pilis rubis, sericeis praedito.

Habit. In collinis saxosis.

Patria: Bolivia, provinci Ayopaya, departamenti Cochabamba. In itinere Morochata-Independencia, 2,300 m.

Columnar, branched 1-1.50 m. tall. Branches light green about 3.5 cm. in diameter. Ribs

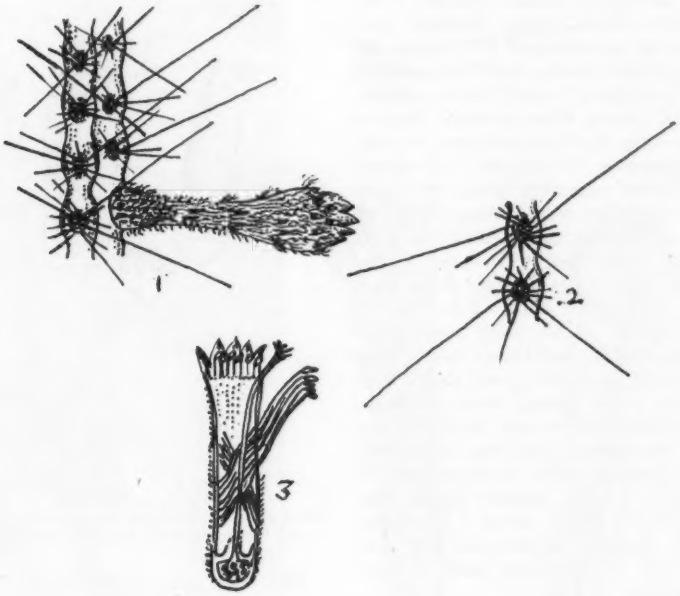

FIG. 36
Cleistocactus ayopayanus sp. nov., 1 areoles and flower;
2 areoles; 3 flower; all x1.0

about 15, rather low, 4 mm. high, 7 mm. broad transversly sulcate. Areoles, 5-6 mm. apart, elliptic, 3 mm. in diameter, prominent, blackish or gray felted. Spines 13-16 not clearly differentiated into radials and centrals. Some areoles with 3-5 central spines which are 3-4 cm. long. Most of spines, 2-8 mm. long, thin acicular, some bristle like, yellow, greenish or whitish hyaline and somewhat swollen at the base. Flower buds densely covered by a red brown glossy wool. Flowers numerous, tubulous, about 4 cm. long. Ovary, 7-8 mm. in diameter, covered by numerous short, acute, light green scales which bear copious dark red upwards appressed hairs. Tube 5 mm. diameter with 4 mm. long, red, green tipped acute scales which bear dense red silky hairs. Outer perianth segments, scale like, dark green, acute, with lighter tips, 5 mm. long; inner segments, petal like, acute 7 mm. long, dark green. Stamens in two rows, not exerted; filaments pink lilac, anthers yellow. Style 2.8 cm. long, thin. Stigma rays 6, dark green, 2 mm. long. Fruit globose 8-10 mm. in diameter with numerous light red, whitish tipped, acute scales bearing silky salmon red hairs.

Bolivia. Province of Ayopaya. Department of Cochabamba. On the way Morochata to Independencia. October 1949. M. Cárdenas, No. 5053 (Type) in the Herbarium Cardenasianum. Cotype in the U. S. National Herbarium.

Obs. This species occurs on the other side of the Mount Tunari which faces Cochabamba at the North and it is characterized by its small to medium sized flowers much slender and greenish tipped.

Cleistocactus luribayensis Cárdenas, sp. nov.

Columnaris, arboreus, ramosus, 2-3 m. altus. Ramis apice valde attenuatis, cinereo viridis, 4-6 cm. crassus. Costis plus minusve 19, 4 mm. altis, 7 mm. latis, transverso sulcatis. Areolis 1 cm. remotis, circularibus vel ellipticis, 5 mm. diam., cinereo tomentosis. Aculeis non distinguentes in radiales aut centrales, tamen non nunquam areolis cum 3 centrales. Aculeis radiales 16-22, acicularis, albis vel temperato bruneis, atro maculosus, radiantibus, 5-15 mm. long. Aculeis centrales 1-4 cm. long., longiores deorsum direxit. Flores numerosis, roseis, 3 cm. long, 5 mm. crassus, tubulosus. Ovario globoso, 1 cm. long., squamis brevissimis, purpureis acutis, pilis brevis copiosus albis et temperato bruneis praedito. Tubus fere curvatus, squamis purpureis, brevis acutis, pilis albis et bruneis praeditus. Phylla perigoni exteriora lanceolata, rosea; interiora lanceolata, salmoneo rosea. Stamina duplo seriali inserta; filamenta albida, antherae diluto flavae. Stylo 2.8 cm. long., albido, paulo stamina superans, 8 lacinis stigmaticis smaragdo viridis coronato. Fructo 2 cm. diam., salmonei roseo, squamis atro rubis, pilis brevis, albis praedito. Semina parva 1.2 mm. long., nigrescentia, puncticulata, nitentia.

Patria: Bolivia, provinci Loiaza, departamenti La Paz, prope Luribay, 2,600 m.

Tree-like, columnar, branched plants, 2-3 m. tall. Branches tapering, green grayish, 4-6 cm. in diameter. Ribs about 19,4 mm. high, 7 mm.

broad, with transversal furrows. Areoles 1 cm. apart circular to elliptic, 5 mm. diameter, gray felted. Spines not differentiated into radials and centrals though some areoles, bear three centrals in a vertical line. Radial spines 16-22, acicular, white to light brown, black spotted. Shortest spines, 5 mm. long, medium sized ones, 10 mm. long and longest ones, 15 mm. long; all radials, spreading. Flowers numerous along the upper section of the branches, from various ribs, 3 cm. long, 5 mm. diameter, thick, tubulous, pink. Ovary globose 1 cm. long with fleshy 1 mm. long, purplish acute scales, bearing dense short light brown and white hairs. Tube slightly curved with purple 1 mm. long acute scales which bear short white and brown hairs. Outer perianth segments, lanceolate, pink, dark red on its middle line, 4 mm. long; inner segments, lanceolate, salmon pink, 4 mm. long. Stamens in two rows; lower ones, 2 cm. long, upper ones 3 mm. long; filaments white, anthers light yellow. Style white 2.8 cm., slightly longer than the stamens. Stigma rays 8, green, 2 mm. long. Fruit 2 cm. in diameter, salmon pink with dark red pink tipped 2 mm. long scales bearing short whitish hairs.

Bolivia. Province of Loaiza. Department of La Paz. Luribay slopes. April 1955. M. Cárdenas, No. 5054 (Type) in the Herbarium Cardenasianum. Cotype in the U. S. National Herbarium.

FIG. 37
Cleistocactus luribayensis sp. nov. x0.1

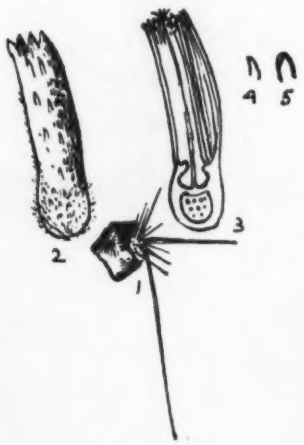

FIG. 38
Cleistocactus luribayensis sp. nov., 1 areole; 2-3 flower; 4-5 outer and inner perianth segments; all x1.0

Obs. This new species of *Cleistocactus* with very short and thick flowers, is characterized by its coarse branches and its geographical distribution, occurring at altitudes ranging from 2,600 m. (Luribay town) to 3,600 m (Upper slopes of the Luribay Valley). It is the northermost species of the genus, we found hitherto in Bolivia and the highest located also.

Cleistocactus angosturensis Cárdenas, sp. nov.

Columnaris a base ramosus, 1.5-2 m. altus. Ramis 2.5-3.5 cm. crassus, herba viridis, apice paulo angusto. Costis plus minusve 15 obtusis, 5 mm. altis, 5 mm. a base latis. Areolis 7 mm. remotis, circularibus, prominentis, cincereo tomentosis. Aculeis radiales 10-13, acicularis, divaricatis, 3-15 mm. long.; aculeis centrales 2-4, inferne direxit, 15-40 mm. long.; omnes aculeis paleari flavis. Flores numerosis ex superne longitudo ramis, tubulosis, plus monusve 7 cm. long, 1 cm. crassus. Ovario globoso 8 mm. long., squamis brevis, atro magentibus, pilis densis, brevis salmoneis, albidis et nigrescentes praedito. Tubus squamis magentibus, apice albidis, pilis bruneis, salmoneis obsitus. Phylla perigoni exteriora lanceolata, parva, 3-5 mm. long., atro viridia; phylla intermedia, lanceolata 15 mm. long.; phylla interiora, lanceolata diluto viridia. Stamina inferiora 6 cm. long., filamenta inferne alba, superne rosei; stamina superiora, 15 mm. long., filamenta alba; antherae omnae atro magenta. Stylo 6 cm. long., albo, paulo stamina superans, 10 stigmatici ramis diluto viridis coronato. Fructo globoso, 2 cm. diam., atro ruber, squamis minutis, apice flavidis, pilis densis, salmoneis, praedito. Semina parva, 1.2 mm. long., puncticulata, nitentia, atro brunea vel nigra.

Columnar, branching from near the base, 1.5-2 m. tall. Branches, 2.5-3.5 cm. in diameter, fresh green, slightly tapering into a tuft of short light yellow spines. Ribs about 15, 6 mm. high, 5 mm. broad. Areoles 7 mm. apart, circular,

FIG. 39
Cleistocactus angosturensis sp. nov. x0.1

FIG. 40
Cleistocactus angosturensis sp. nov., 1 areole; 2-3 flower dissection; 4 fruit; all x1.0

prominent, gray felted. Radial spines 10-13, acicular, spreading; shortest ones, 3 mm. long, medium sized ones, 10 mm. long, longest ones 15 mm. long; central spines 2-4, 15-40 mm. long, downwards directed; all spines, straw yellow. Flowers numerous from near the top of the branches, tubulous, about 7 cm. long, 1 cm. diameter. Ovary globose, 8 mm. long with dark magenta fleshy scales bearing dense salmon white and black short hairs. Tube with magenta, whitish tipped scales which bear salmon-brown hairs. Outer perianth segments, short lanceolate 3-5 mm. long, dark green, middle segments lanceolate, 15 mm. long; inner ones lanceolate, 15 mm. long, light green. Stamens in two rows, lower ones from near the bottom of the tube to 6 mm. above, 6 cm. long with filaments white below and pinkish above; upper stamens 15 mm. long with white filaments; all anthers, dark magenta. Style about 6 cm. long, white, slightly longer than the stamens. Stigma lobes 10, light green, 5 mm. long. Fruit globose, 2 cm. in diameter, dark red with short, yellowish tipped scales which bear dense salmon silky hairs. Seeds 1.2 mm. long, puncticulate, glossy, dark brown or black.

Bolivia. Province of Tarata. Department of Cochabamba. Angostura, 2,550 m. August 1955. M. Cárdenas, No. 5055 (Type) in the Herbarium Cardenasianum. Cotype in the U. S. National Herbarium.

This long flowered *Cleistocactus,* has the general habit of *Cl. buchtienii* Bakbg. var. *flavispinus* Cárdenas, but differs by its coarser branches and the greenish perianth segments.

EDITOR'S NOTE: Society members will be interested to see the number of new species being found by Dr. Cárdenas. Next Journal will continue with new Echinopsis.

ARTICLES AND PHOTOS WANTED

We would like a series of articles with photos of native plants of Texas, New Mexico, Arizona, Colorado, etc. Our membership in the Southwest is growing rapidly and we should have many articles and photos from this section of the country which is so rich in cacti.

CACTUS & SUCCULENT SOCIETY OF CALIFORNIA

After a short business meeting, during which our hosting of the 1957 convention was discussed, Myron Kimnach led a symposium on the repotting of succulents. Most of the members participated, whether experts or beginners. It was pointed out that repotting need not be done only in spring but can be varied according to convenience and the growing seasons. At the UC Botanical Garden for example most cacti are repotted in November and December so that during spring more time can be devoted to other important duties. Winter-growing succulents, however, are repotted in July and August. Many of the easier, quick-growing species can be safely shifted to larger pots at any time during the year. As to pots, the general opinion was that nearly all cacti and succulents did best in the conventional deep pot rather than in half-pots or pans, providing correct soil and sufficient drainage material were used; most low-growing plants look better in shallow pots, though, and with more careful watering will thrive just as well. The best soil for most cacti and succulents was considered to be fairly coarse leaf-mold mixed with enough lime-chips, gravel or sand to ensure drainage. Inclusion of much soil always increases the danger of rotting. Echeverias are especially suited to a leaf-mold mixture, while many mesembs and the more difficult cacti prefer a sandier mix. Insect pests encountered while repotting are root mealy bug, the common mealy bug (which often lives on the roots of plants grown in a coarse, periodically dry soil) and nematodes. The mealies are best destroyed by washing most of the soil and insects from the roots and then dipping or spraying, if possible repeating this two weeks later. To avoid the inevitable damage this treatment causes to the roots one may leave the pests undisturbed and place paradichlorobenzene crystals in the bottom of the new pot; some of the members claimed this to be effective, others believed it of little value. More efficient was a thorough watering of the potted plant with a solution of Malathion. This spray also seems one of the best for above-ground pests. It has been found to burn the leaves of Echeverias and Kalanchoes in a warm, sunny glasshouse, but these plants seem sensitive to nearly all insecticides. When nematodes are found, all roots should be removed and any infected portions of the stem cut away; the plant is then thoroughly washed and rerooted. The used pots in this case should be thrown away or boiled. Hot-water treatment of the roots is difficult and requires patience and care. Many members were in favor of feeding their plants rather than repotting every year or two; Vigoro was recommended, a quantity of this material being placed on the surface of the soil around the pot rim so that some would soak into the soil with each watering. Other aspects of repotting were also discussed.

Many interesting plants were exhibited by the members. Of those from the Botanical Garden the most outstanding was *Kalanchoe pumila*. This species, introduced by the Garden to this country in 1954, seems destined for great popularity with collectors. It is dwarfed and compact, attaining a height of but five inches when not in flower, the leaves are mealy-white, turning purplish in strong light, and the magenta flowers are rather large. The plant exhibited was in full flower and caused considerable enthusiasm among the members. *Echeveria chihuahuaensis,* a rare member of the Urbinia group, made a perfect picture of symmetery with its delicate pastel colors and arching inflorescence. Similar in effect was *E. cuspidata* with bluish, pink-edged leaves. An interesting crest of *E. subrigida* var. *palmeri* was shown; originating in the collection of Robert Flores, it is unusually symmetrical for an Echeveria crest. A branch of *Chiapasia nelsonii* with six flowers made a pretty sight; while the flowers are beautiful, the plant itself has an unattractive manner of growth and is not easy to keep in good condition. Mr. Hastings commented that the hybrids between this species and various Orchid Cacti had inherited all these bad features. Al Irving brought some beautifully grown rarities, including *Aloe krapohliana,* a dwarf suited for pot culture; its dark-green leaves curve attractively and the flowers are also fine. H. M. Butterfield brought a group of Echeverias, most of them being highly selected seedlings derived from *E. gigantea* or its hybrids. These are truly magnificent plants which will become very popular when available. The highly-colored leaves are crinkled at the edges and bordered with deep red or purple. Mr. Butterfield has been developing these forms for many years. He also showed a recent seedling of the locally famous *Echeveria* "Edna Spencer", a nearly stemless cultivar displaying heavily embossed leaves similar to those of *E. gibbiflora* var. *carunculata;* this recent seedling carries the carunculation to extremes, the processes being long and finger-like.

Finally Paul Hutchison of the Botanical Garden showed many slides of great interest. First were some taken in Namaqualand by H. Hall of Kirstenbosch, South Africa. *Adromischus* and *Cotyledon* species growing in seemingly soil-less cracks and depressions in the rocks made a colorful and instructive sight. Some of the very plants pictured had been sent to the Garden by Mr. Hall and these had been brought to the meeting so they could be seen in detail. As many as eight species of succulents were represented in one close-up, growing in one of the world's finest natural rock gardens. Slides sent by H. Herre of Stellenbosch were also shown. Then a long series of slides from Reid Moran were much enjoyed. Dr. Moran, at present teaching in Japan and Korea, is making important collections of *Crassulaceae* in those regions, and his photos showed many species in their native habitat. Most interesting were several species of *Orostachys, O. japonicus, O. minutus* and *O. malacophyllus* in different stages of their growth cycle, from the tightly closed dormant rosettes to the tower-like spiralled inflorescences. The Botanical Garden now possesses a large collection of some 200 numbers of *Sedum* and *Orostachys* sent by Dr. Moran. The slides showing Sedums in the wild were quite colorful; *S. yezoense, S. formosanum, S. kamtschaticum, S. japonicum, S. cauticolum* and *S. oryzifolium* were a few, all with cheerful pink or yellow flowers.

After the show of slides, an unwrapped package of Sedums received the day before from Japan was opened so the members could see the method of wrapping and labeling, condition and appearance of the plants, and, perhaps most of all, experience the fun of that highpoint in the collector's life, the opening of a parcel of imports.

MYRON KIMNACH
Affiliate Secretary

NEW YORK CACTUS & SUCCULENT SOCIETY

A meeting was announced for last March 17 at the home of Mr. and Mrs. Joseph Emma, 274 First Ave., Apt. 12-D, New York. The subject of the meeting was not announced—perhaps it was "Insectaside" by the host (see Nov.-Dec. Journal pg. 183). New Yorkers should contact this active New York club.

"ADDISONIA"

Edited by Edward Johnston Alexander, Associate Curator of the New York Botanical Garden. Vol. 23, No. 1 contained a color-plate and description of *Haworthia cuspidata.* Vol. 23, No. 2 (Nov. 1955) contained a beautiful color-plate of *Gasteria pulchra.* Both paintings were made by M. E. Eaton.

QUESTIONS and ANSWERS

Conducted by
HARRY JOHNSON
Paramount, Calif.

Question: Please tell me how to water my *Aloe microstigma.* If I let it get dry the leaves dry up, the tips first, but if I water from top and bottom the leaves get soft and juicy as though I were over-watering. It is one of my favorites and I don't want to lose it.

MARYBELLE BLEHM, *Oregon*

Answer: You have posed the good but eternal question of the beginner and some of us who are not such beginners! You say, "not to water and it dries up and then I water and the plant gets soft." Dealing with living things under normal, uncontrolled conditions, one cannot give precise instructions. So many ounces of water, so many days apart just does not work. The beginner or careless observer just lacks points of reference to form judgments. When his observations pile up, his judgment gets better and pretty soon he knows the answer. The *Aloe* in question may be suffering in one of several ways. The room in which it is kept may have an unvented burner—gas or coal. That would make the tips die back. The humidity may be very low. That also would do it. The roots may be in bad condition due to a heavy soil and too much water applied perhaps months ago. Anything that lowers the vitality of the plant could cause the burned tips. In reversing the process and watering, the plant got juicy. I take it that it was not rot but simply succulence. Apparently for the time of year, the extreme cold experienced early in the fall in Oregon and the lack of opportunity to ventilate, the plant got too much water. It can take more water when ventilation is free. During cold inclement weather it is often impossible to prop erly ventilate. When this happens, water only lightly even if you have to do it more frequently. Don't go to great extremes either in letting plants dry out or in giving water. Of course this is where we just came in! The beginner must really be frustrated by the so-called "expert". None of us are experts—we have just been at it longer.

Question: Why do cacti turn purple in the winter and why is the phenomenon inconsistent? Last year my *Epiphyllum ackermannii* was a crimson purple. This year it is green. My *Epiphyllanthus obovatus* has both purple and green phases in the same greenhouse. Secondly, my Epiphyllanthus plants are not doing too well. Mine do not graft easily and when grafted they drop their branches. They don't do well on their own roots either. I am now trying to grow one in Osmunda fiber along with an orchid. This promises to be a good year for most of my collection. None have rotted and all are showing signs of renewed growth. Many have buds showing.

J. M. RILEY, Georgia

Answer: The purple and red tints in cacti generally are seen when growths have reached maturity. The experienced grower welcomes them as evidence that his cultural procedures are pretty close to right. The coloring matter is erythrophyll, probably the same thing that makes a maple leaf red in the fall. It is probably always present in some amount but cloaked during active growth by chlorophyll—the green coloring in stems and leaves. The reason both red and green phases are present in the greenhouse is due probably to differences in the various plant's growth and hence in maturity. Many succulents and cacti become quite red in the fall with the onset of cold weather and winter rains which checks growth. Others may be made to turn red during summer if a poor soil is used and a minimum of water is applied. This also checks growth. It probably all hinges on chemical changes within a plant that occur during the change over from active growth when it is manufacturing and using food in growth, to where it is manufacturing and storing food for the next season's growth and flowers.

Epiphyllanthus is a small genus from southern Brazil with flowers almost like *Zygocactus.* The plants are very different looking, in the species *E. obovatus,* like small *Opuntia* pads. They grow in the mountains and seem to like a cool, moist atmosphere. They are small plants and are epiphytic or grown on the rocks. When grown warm (60 degrees) they often fail to flower. If kept quite cool with temperatures at night down to 40 degrees, or even less occasionally, though rising with sun heat to 60 to 80 degrees during the day, they flower profusely. I have had no trouble in grafting them on *Selenicereus* on which they grow quickly and easily. They root quickly in a loose, peat moss mixture. This is not the best mixture to grow them in as it breaks down. Sponge-rock or Perlite should be added in considerable quantity. This is a very light, air-filled aggregate completely inert. Certain types of glassy lava is ground up and subjected to temperatures of 1800 degrees when it pops like popcorn from the contained gasses. It never breaks down and holds a lot of air. The fine grades used in wall

plaster as an aggregate are excellent as they don't float. The coarser grades are fine if kept beneath the surface. For the more difficult small epiphytic cacti such as *Schlumbergera, Rhipsalidopsis, Xmas Cactus,* etc., Perlite is the best basic aggregate to use. Much better than sand or Vermiculite as far as my own experience goes. With it you can mix sand, peat, Sphagnum moss, loam, etc., to produce a hundred potting soils.

Question: My Night Blooming Cereus which has leaves 3 inches or so across and which I brought in a few weeks ago is not doing so well. The tips of the leaves have turned black a half inch or so. I am afraid it will die. Is this a blight and is there anything I can do for it? It is now 5 feet tall and had two beautiful, white, fragrant flowers and a great many buds which dropped. I am afraid the room is too warm (60 to 70 degrees) but the plant is too large to get into the basement.

MRS. CORA FRANK, Ohio

Answer: The plant is *Epiphyllum oxypetalum* or as it used to be known *Epiphyllum latifrons.* The die-back of the tender young "leaves" is probably caused by the warm, dry air of the house and is not a disease. If given a light situation and not allowed to become too wet or too dry, the plant should come through the winter in good shape. As soon as frost is over in the spring put it out doors. It may again lose some older "leaves" but should soon become used to the changed growing conditions and start growth as the weather and nights get warmer.

EDITOR'S NOTE: Our readers obtain much helpful information from these Questions and Answers. Be sure to send in your questions no matter how elementary they may seem. Harry Johnson of Johnson Cactus Gardens, Paramount, California, is a very busy man but he always takes time out to share his experience with you.

PLANTS WATCH THE CALENDAR

It is strange how the same cactus, or closely related species, flowers the same day whether pot grown, in the ground, in dry situations or in lush conditions. Many of the Mesembs. have been especially fine this winter in California and do not change their flowering period even though our winter is the South African summer. *Crassula arborescens* can be depended upon to flower at its best the middle of January then come the Aloes, Kalanchoes, Echeverias, and Sedums. *Aloe variegata* and Gasterias flower well as pot plants in sunny windows of the New England States during the cold winters.

WANTED

Heliocereus and *Nyctocereus* other than *H. cinnabarinus, H. speciosus,* and *N. serpentinus.* Will buy or trade. Marvin Tooley, 4830 Waltham Drive, Corpus Christi, Texas.

EPIPHYLLUM SOCIETY OF AMERICA

With the appointment of the various committees, the President, Mr. C. L. Wright and the Executive Board completed plans for the coming year. The following committees were appointed: PICTURE CONTEST: John E. Coleman, Ed Wright, Sherman Beahm; GARDEN TOUR: Arnold Horning, Dr. J. W. Troxell, Mr. R. E. Wright; FLOWER SHOW: John Coleman, Mrs. Vicki Dibben, Mr. R. E. Wright; HOSPITALITY: Mrs. Martha Maxwell; PUBLICITY: Mrs. Gene Luckenbacher; PICNIC: Mrs. Martha Maxwell, Gene Luckenbacher, Irene Surola; GUEST BOOK: Mesdames C. L. Wright, Mrs. R. E. Wright; CONSOLATION CARDS: Mrs. Helen Beaumont; RESEARCH BOARD: Sherman Beahm, Herbert Irwin, Clark Malcho, C. L. Wright and Gertrude W. Beahm. Those named on the committees represent the neucleus with the hope that other members will join in the activity of their choice.

The Epiphyllum Flower Show will be held at the Verdugo Playground, 3580 Verdugo Road, Los Angeles, May 16, 7-10 p.m.

It is with real hope that all the members will avail themselves of the opportunity of exhibiting flowers, arrangements and pictures this year. The research board will continue to disseminate more information and knowledge of the culture and nomenclature of the plants. At each meeting, an effort is being made to promote the interchange of ideas by the Epiphyllum growers and collectors. Several members have lively Round Robins which encourages correspondence between members.

Mrs. Martha Maxwell, Corresponding Secretary, at 500 Grove Place, Glendale, Calif., graciously answered many questions and carried on correspondence over and above the call of duty, this past year. If any additional information about the Society is required, please direct your questions to her.

FROM CORPUS CHRISTI, TEXAS

Dear Mr. Haselton:

I would like to compliment you on the January-February issue of the Journal. In my ten years of reading the Journal, there have been few issues to equal it.

I was very much interested in the new Epiphyllum and the *Cryptocereus.* Are these now availabe to collectors?*

The article by Mr. and Mrs. Kres of San Antonio was also of interest to me since I have many problems in common with them. I have been able to use the "gumbo" they mentioned by turning into it manure, leaf-mold, and builder's sand. I have a Cephalocereus senilis, Eriocereus martinii, and many native cacti are planted in this mixture in open beds, and they have survived not only long dry spells but a 14" down-pour as well. My main problems are high humidity and high winds in the spring, and weeds which grow up among the spines and defy removal.

I am able to grow most of my plants outside—even my Epiphyllums. We rarely have frosts or freezes here, but the temperature does drop to the middle thirties several times during the winter.

I am interested in collecting as many species of Heliocerei and Nyctocerei as possible, but I have been able to buy only *H. speciosus, H. cinnebarinus,* and *N. serpentinus* from dealers. I would like to trade or buy other species of these two genera.

MARVIN TOOLEY
4830 Waltham Drive
Corpus Christi, Texas

*Beahm Gardens, 2686 Paloma, Pasadena, California, have a few plants for sale.

The New York Botanical Garden is doing an outstanding educational job which we must all do eventually, namely re-educate the "masses" to the value of a public garden whether it be park, plant collection, or arboretum. Most of the gardens I've visited seem dowager-like sitting back complacently with laurels garnered 30-50 years ago resting insecurely on a noble view believing the false premise that the public is still interested in the estate-type of plantings. The small flower or vegetable garden in the back yard, foundation plantings and block beautification have been the life-saver for the "Flower Show" of the first third of the century. Each time the "growers" complain to me about the declining popularity of the "single plant" house or "related plant" house type of collection, I tell them we are the ones that are to blame for we were on a flower-arranging-spree when the public was ready to look at the botanicals.

Again public gardens with specialists in a single plant-type have let the other collections deteriorate or merely survive while growing or grooming their favorite. Others have rode the crest-of-the-wave and have now been engulfed by the very group whose favor they courted. The public is not always right, but they do desire change, color, novelty, and above all a sense of familiarity with what they see. Most of us have grown tired, careless and cynical, but not the public I talk to. They know about mounting costs, help problems and other ponderables.

While in the New York Botanical Garden (Herbarium, Garden, Greenhouses, etc.), I talked to people that I met. Not one of them felt that the Gardens had met the public half way. One elderly gentleman who told me he had been in and out over a period of 50 years shrugged his shoulders at the educational efforts. He told me there is not enough consideration given to "impermanence" at the Garden. He pointed out untrimmed trees and shrubs with dead branches as well as broken branches, flower borders full of weeds, grass overgrown walks, leaf clogged paths and rusty fences. He told me he never goes into the plant houses anymore because the paths are muddy, the exhibits untended and left too long to be effective. I asked him if he had seen the tropical room with the tiled pool, little wooden bridge, etc. (where the cacti and succulents had been). No, he had not and from my description he'd stay away because any New York night spot could duplicate it. He did not agree that this was a change in the right direction.

Although I told him I was pleased to see the plant sales room with young buyers eagerly checking on their purchases and going to see the adult plant growing in the Conservatory near-by, he was unconvinced. I saw promise for the future in these yougsters. I had seen miles and miles of barren back yards, back porches, balconies and yards along the railway and subway right-of-way as I went to the Gardens. To get growing plants into the hands of the youngsters today will give the Garden a stimulus in the next decade or so. It's a step in the right direction since most of the other educational projects are for adults.

I studied the layout of the Conservatory through the plantings of camellias, chrysanthemums, orchids, ferns, tropicals, trees, vines, etc., and then to the cactus and succulent house which I had read about in E. J. Alexander's book "Succulent Plants of the New and Old World Deserts".

The cactus collection has been "lifted" (not too gently) and moved into this "end-of-the-line" location (it used to be at the right-hand of the main entrance). To me it no longer ranks as one of the outstanding exhibits (August 1955). I had seen a few Epiphyllums and Rhipsalis in the fern and orchid houses as I came through but didn't stop. They had been broken, slug-eaten, and over-watered until they were of doubtful scientific value. Many of them were original numbered cuttings of Br. and R. and MacDougall imports. I was amazed that my little 9x15 house could yield such fine results when the Garden had the experts in construction, cultivation, and "know-how". There was no pride of display. Perhaps it is the same old story—the big gap between the "writers" and the "growers".

Of course I am partial to cacti and the other succulents and I had hoped that the New York Botanical Garden would maintain perhaps a small but well kept collection of these plants so that those who enjoy the unusual of our own Americas could come to observe and study.

For some years Arnold Davis, Director of the Cleveland Garden Center, has sponsored small gardens and block beautification which is also a part of the Cleveland City Greenhouses agenda. The small gifts of money are the order of the day in Cleveland. The educational plan is that every child is a potential nature lover and a contributor to civic projects. The Cleveland Board of Education provides courses in horticulture, greenhouse culture of plants, as well as garden planning and care.

On my way to Quebec, I stopped off at the Montreal Botanical Gardens and was interested to see walled-in gardens devoted to orchard trees, vineyards, vegetables, and flowers. The long approaches to the administration building were bordered with flowers. This is a young and vigorous garden responding to a new era where city children are brought close to the soil and learn the patience which it takes to tend and grow plants.

The effect of the whole garden is one of color and beauty as well as utilitarian appeal. The approaches are a part of a well thought out plan with a harmonious blending of annuals and perennials to form patterns in color. The future as well as the present is always in sight. A permit to enter the greenhouses was given me as the author of "Cereusly Speaking". There was a curtain of *Aporocactus flagelliformis* (see Cactus and Succ. Jour. XXV, No. 6, pg. 181) which had now reached 10 feet long in its vigorous growth. The original 18-inch stock of *Hylocereus triangularis* on which it is grafted was selected because of its vigorous type of aerial roots which have traveled from one suspended pot to another. Behind this specimen was a "laboratory" of cacti and succulents which were the finest plants I have seen in any collection: grafted, air-layered, on own roots, in sand with chemical solution, or in various soils, it didn't matter—all were happy and perfectly acclimated.

A chance meeting of Laval Goulet, of Amos, Quebec, made the balance of the tour extra enjoyable. In the four other glasshouses of cacti and succulents there was one surprise after another. The Rhipsalis, Zygocactus (see this Journal Vol. XXVII, pg 16), Schlumbergeras, Epiphyllums, etc. were the most outstanding with the finest cultural methods I have observed anywhere. The Echinopsis, Lobivias, Malacocarpus, Parodias, and Wilcoxias were showing a fine

response to the new treatment which had been started a little more than two years ago. Mr. Verschingel, the chief grower, is a plant enthusiast who has applied common sense and plant sense to Xerophytes. The succulent house which contained some vining cacti as well as rarer succulents was being restocked with related groupings. Many of the specimens were only "literary forms" to me. I was convinced that Canada is taking up the torch where we have laid it down and will continue to do so until such time as our jaded public becomes conscious of our American natives. We hope that Dr. H. Teuscher, the Director, and Mr. Verschingel will write an article for our Journal on their cultural methods.

On the tour of Quebec with the Goulets we did not see many succulents in the window gardens nor greenhouses but our neighbors to the north are much more interested in civic landscape than is our average city.

I have visited The Missouri Botanic Gardens in St. Louis; the Huntington Botanic Garden in San Marino, California; the Los Angeles State and County Arboretum in Arcadia, California; The Cleveland, Ohio, City Greenhouses with the cultural gardens of many nations; the Eastman Park and Highland Park in Rochester, N. Y.; Buffalo City Parks; the Detroit, Michigan, Belle Isle Conservatory; the Cincinnati Conservatory; the Exhibition Hall for Floriculture at the Toronto National Exhibition; the Botanical Garden in Washington, D. C.; and now these in Montreal and New York. I do not feel that Xerophytes are being totally neglected as yet but it does seem that since many of the European cactus and succulents collections were ruined by the wars, many of their trained growers have come to America. The future is bright for Xerophytic plants and it is our duty to disseminate more information and to encourage private and public collections.

JOHN E. C. RODGERS
1229 W. 8 Street
Lorain, Ohio

FROM NEW YORK

February 4, 1955

I have some news from New York City that may be of interest to other city dwellers. In the November-December issue of the Journal photographs of my home fashioned window greenhouses were published, and I expressed the hope that I might have hit on a way to flower some of the more difficult Cacti in the adverse conditions of a steam-heated city apartment. So far in early February the results are so hopeful that I thought it warranted a letter.

Temperatures in New York have been extremely low, as low as 8 degrees outside and my greenhouses have dropped down to twenty-five degrees at times during the night. Humidity is almost non-existent because of steam heat. During our few sunny days temperatures in the greenhouses have gone up to about 80 degrees.

Mammilaria habniana has a crown of fifteen buds at this writing and I would guess they should open late this month. *Gymno. denudatum* has three buds appearing which is early for this plant. *Mam. hemisphaerica* has three buds on a round two-inch diameter plant. *Rebutia violaceflora* has seven buds and *Rebutia minuscula* has two buds. Both Rebutias are kept next to the glass and have taken extreme cold. Buds have formed only on the south side of the Rebutias where they get most light. I believe this is early for *minuscula*. It is unusual for Rebutias to bud in New York apartments and I have never heard of it before. They need plenty of cold and dryness and all the sun we can give them here.

Cactus country dwellers can not imagine the thrill New Yorkers experience when they get flowers on their plants as it is an unusual phenomena in this land of cement and bricks. I still think that aside from sun many Cacti need plenty of cold and dryness in order for buds to develop. Hope to have more information soon from the frozen East.

RICHARD RUSSELL

DISASTER IN FRANCE

A terrible disaster has fallen upon the French Riviera where my own garden is. Minimum temperature we usually had in uncovered places was 24°F. and 27°F. in covered ones. One foot of snow has already fallen this year on the Riviera. The temperature went down to 18° in uncovered places and we nearly had the same temperature in covered ones as the heavily fallen snow upon trees not used to carry such weights, broke down the largest part of the cover.

My collection of tropical and even sub-tropical plants which amounted to about 10,000 varieties has been completely destroyed. The cold is still on. It will stop the regrowing of many plants from the roots or trunks, which will be frozen as well.

In the name of the solidarity between Botanical Gardens I am asking for your help if ever I have the courage to start my collection all over again. I could give you in exchange seeds of cacti and succulent plants. They all were under glass and have not been damaged. I mostly lost Araliaceae, all the Aroids, Palm-Trees, 24 species of Chamaedorea in numerous exemplaries, 7 different species of Tree-Ferns in many exemplaries, also Bromeliads of which I do not have yet the exact list and many other plants.

I shall in due course of time take the opportunity to send you my list of desiderata. I hope you will be able to help me out in letting me have a few species of remainder of your collections in order to rebuild at least part of the garden I had.

Thanking you very much in anticipation for all you will do,

JULIEN MARNIER LAPOSTOLLE
Jardin Botanique "Les Cedres"
St. Jean-Cap-Ferrat (A.M.), France

YEARLY REPORT 1955

The Colorado Cactophiles report as follows:

Regular Monthly Meetings held 9, Field Trips 1, Vacation Months 1, Christmas Party 1. Six new members enrolled this year.

Membership consists of 19 adults and 12 juniors. Average attendance 14 members and 7 guests.

During the year, one Delegate attended the National Cactus and Succulent Society Convention July 7th to 12th inc. Colored slides secured from National as well as those taken by Miss Andes, Richmond, Va., and by several members of the Colorado Cactophiles, were shown and cacti and succulents discussed. One meeting was turned over to Mr. Tomlin, President of our group for instruction on grafting.

Cactus seeds furnished by one of our members were distributed among the group, sown and reports on same given at our November meeting.

25 or 30 colored slides of Colorado Cacti were sent to the National Society for their lending library.

OFFICERS FOR 1956

President—Mr. A. L. Chambers
Vice President—Mrs. H. F. Bartling
Sec.-Treas.—Mrs. S. L. Heacock
Aff. Rep.—Mrs. Wm. Rutschman

FIG. 41
Desert scene arranged by the Cactus and Succulent Society of San Antonio, Texas

FROM TEXAS

A blue ribbon for the best non-commercial exhibit was awarded to the Cactus and Succulent Society of San Antonio at the Fall Flower Show of the Men's Garden Club, held at the Municipal Auditorium. This was the first show of the Society's youngest affiliate and the results gave encouragement to the entire membership, as well as contacts which should bring in many new members.

The exhibit consisted of a desert scene of specimen cacti and succulents covering an area of one hundred square feet. The sand in which the cacti were set was dotted with colorful rocks which gave it a realistic appearance. According to one of the show judges, this was the most "dramatic" in the show.

Along the side of the exhibit was a table arranged with specimen mammillarias and other smaller cacti, together with a table of smaller succulents. A miniature cactus and succulent garden was displayed between the two tables. The plants exhibited were loaned by members, who also took turns on duty at the exhibit. Two members were on duty at all times during the two-day show, greeting visitors to the exhibit, with catalogues and free literature on culture available. Twenty-eight visitors signed up as interested in joining the society, and floods of questions were answered about culture, etc.

The desert scene was arranged by Jesse Thomson, who also lectured on cacti as part of the show's program. The succulent lecture was given by Joseph Kres, the Society's President. Practically every member participated in the show, either by displaying plants or serving on duty at the exhibit.

The first field trip of the San Antonio affiliate was conducted last November into the hill country, twenty miles north of Fredericksburg, Texas. Arrangements were made with a rancher to permit the members to explore the granite hills of his five hundred acre ranch and collect cacti. The ranch borders on the Enchanted Rock, a point of interest for tourists, located ninety miles north of San Antonio.

Members on this trip found many large clusters of *Echinocereus triglochidiatus* growing between huge granite boulders with their roots running down into the pockets of humus collected between the rocks. At this elevation of 2200 feet, the *Echinocereus reichenbachii* has red and dark brown spines, whereas those growing around San Antonio have white spines. This is granite country, whereas, San Antonio is limestone formation. The *Hamatocactus setispinus* tends towards the columnar variety instead of the globose variety found around San Antonio. *Mammillaria hemispherica* and *Homalocephala texensis* were also found. Numerous species of Opuntias flood this country. Attractive specimens were collected by those participating.

Election of officers for 1956 was conducted at the December meeting of the Cactus and Succulent Society of San Antonio. New officers are: President, Lucia Kres; Sec'y-Treas., E. Wadell; Vice-President, Harold Solwisch; Board Members, Jonnie Fillingame and Joseph Kres.

JOSEPH KRES
1321 Austin Hwy.
San Antonio, Texas

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Las Animas Colorado

MEXICAN CACTUS MAGAZINE

The third issue of "Cactaceas y Suculentas Mexicanas" has been received. In this issue is a new species, *Nopalea escuintlensis* by Prof. Eizi Matuda. Other contributors were Dudley B. Gold, H. Sanchez Mejorada, Dr. Helia Bravo, and Dr. Jorge Meyran. There are many fine illustrations including *Tillandsia recurvata* growing on telephone wires; this is the Tillandsia which George Olin has collected in Arizona. You should send $2.00 to Dudley B. Gold, Aniceto Ortega 1055, Mexico 12, DF., and receive all issues to date.

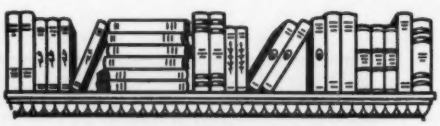
WANTED

Volumes II and III of the National Cactus and Succulent Journal of Great Britain. Quote price to Cactus Journal, 132 W. Union St., Pasadena, Cal.

DESERT PLANTS RESEARCH SOCIETY

Desire to contact cactophiles, dealers, collectors and amateurs, in the U. S. A., Mexico and South America, for the exchange of information and if possible purchase of various rare plants and seeds.

T. KAKU
2126, Katase, Fujisawa, Kanagawa,
J A P A N.



MAMMILLARIA BOOK SOLD OUT

This is to announce that Dr. R. T. Craig's monograph, "The Mammillaria Handbook" is no longer available. There are no plans for reprinting. Used copies may be available from time to time.

CACTUS AND SUCCULENT JOURNAL

The following complete volumes of the Cactus and Succulent Journal of the Cactus and Succulent Society of America are now available. Some of the early numbers are reprints but are complete (the inserts have been removed) with indexes. For bound copies add $2.50 each volume. Add 10¢ per volume postage in USA. Volumes delivered in California please add 4% sales tax. For a consecutive run of 10 or more volumes a 10% discount is allowed.

VOLUME	PRICE	VOLUME	PRICE
I (1929)	$10.00	XV	7.00
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III	10.00	XVII	6.00
IV	6.00	XVIII	6.00
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XIII	3.00	XXVII	5.00
XIV	3.00		

The next list of Journals will include broken volumes and single issues. Now is the time to complete your sets and for those who wish, budget terms may be arranged.

LAD CUTAK'S BOOK NOW READY

The "Cactus Guide" is now ready for distribution. The publisher states:

This book supplies the information essential to home cactus culture. Though the cactus flourishes under conditions ranging from the greenhouse to steam-heated apartments, maximum beauty in flower and form depends on the knowledge of a few simple principles. Following Mr. Cutak's expert guidance on soils, feeding, rest periods and watering will help you to achieve astonishing results, while the chapters on culture and propagation will enable any collection to be expanded inexpensively. More than one hundred and seventy of the important cultivated species of cactus are identified and classified, with their appearance, native habitat, requirements and characteristics. Particular attention is paid to the kinds most rewarding to the home grower; plants like the Jungle Cactus and its hybrids; and the Pincushions and Nightblooming Cereus. Drawings by the author illustrate varieties and techniques, and there is included a list of the many cactus clubs here and abroad.

Although we have not received a review copy we are ordering sufficient copies to fill the many advance orders of a year ago. 144 pgs. 6x9 in., 16 pgs. of drawings. The price is $3.95 postpaid. California buyers please add sales tax.

Abbey Garden Press, 132 W. Union St., Pasadena, Calif.